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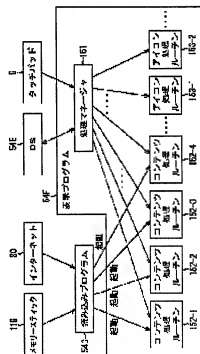
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(54) INFORMATION PROCESSING SYSTEM AND METHOD, AND PROGRAM STORING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To know definitely that an operation is added to a thumbnail.

SOLUTION: In the information processing apparatus and method, a process manager 151 detects an operation of users and specifies the display position of the thumbnail according to frequency of the operations detected per unit time, a content processing routine 152-1 generates the thumbnail corresponding to data and controls the display in order to display the thumbnail at a specified position.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]Especially this invention relates to the information processor which displays the thumbnail corresponding to data, a method, and a program storing medium about an information processor, a method, and a program storing medium.

[0002]

[Description of the Prior Art]In recent years, in a personal computer etc., the art of displaying the thumbnail corresponding to the data of a still picture or video, making a user choosing the data of a still picture or video by a thumbnail, and making these data operating it has come to be used.

[0003]

[Problem(s) to be Solved by the Invention]However, when a thumbnail is operated, the color of a thumbnail changes or a user may be unable to recognize that a sound is only outputted and whether operation was inputted correctly.

[0004]This invention is made in view of such a situation, and it aims at enabling it to get to know that operation was added to the thumbnail certainly.

[0005]

[Means for Solving the Problem]written this invention is characterized by it having been alike and comprising the following at claim 1.

A detection means to detect a user's operation.

A creating means which generates a thumbnail corresponding to data.

A setting means which specifies a position of a display of a thumbnail corresponding to frequency in unit time of operation which a detection means detected.

A display control means which controls a display to display a thumbnail on a position specified by a setting means.

[0006]The setting means can specify a position of a display of a thumbnail on a spiral of imagination of a radius corresponding to frequency in unit time of operation.

[0007]written this invention is characterized by it having been alike and comprising the following at claim 3.

A detecting step which detects a user's operation.

A generation step which generates a thumbnail corresponding to data.

A specification step which specifies a position of a display of a thumbnail corresponding to frequency in unit time of operation detected by processing of a detecting step.

A display control step which controls a display to display a thumbnail on a position specified by processing of a specification step.

[0008]Written this invention is characterized by a program of a storing medium comprising the following at claim 4.

A detecting step which detects a user's operation.

A generation step which generates a thumbnail corresponding to data.

A specification step which specifies a position of a display of a thumbnail corresponding to frequency in unit time of operation detected by processing of a detecting step.

A display control step which controls a display to display a thumbnail on a position specified by processing of a specification step.

[0009]In the information processor according to claim 1, the information processing method according to claim 3, and the program storing medium according to claim 4, A user's operation is detected, a thumbnail corresponding to data is generated, and a display is controlled so that a position of a display of a thumbnail is specified and displays a thumbnail on a specified position corresponding to frequency in unit time of detected operation.

[0010]

[Embodiment of the Invention]Drawing 1 thru/or drawing 4 are the figures showing the appearance of the 1 embodiment of the personal computer of the note type concerning this invention. This personal computer 1 is fundamentally constituted by the indicator 3 whose opening and closing are enabled to the main part 2 and this main part 2. Drawing 1 is an appearance perspective view showing the state where the indicator 3 was opened to the main part 2. It is the enlarged drawing of the jog dial 4 with which drawing 2 is provided in the top view of the main part 2, and drawing 3 is provided in the main part 2 and which is mentioned later. Drawing 4 is a side view of the jog dial 4 provided main part 2.

[0011]The touch putt 6 as a pointing device operated when moving the keyboard 5 operated when inputting various kinds of characters, signs, etc., and the pointer (mouse cursor) displayed on LCD7 to the main part 2, and the electric power switch 8 are formed in the upper surface. The jog dial 4, the slot 9, the IEEE1394 port 101, and the memory stick slot 115 grade are provided in the side of the main part 2. It is also possible to replace with the touch putt 6 and to form a stick-type pointing device.

[0012]LCD(Liquid Crystal Display) 7 which displays a picture is provided in the transverse plane of the indicator 3. The lamp which comprises message lamp ML (not shown) provided power indicator PL, the cell lamp BL, and if needed and other LED is formed in the upper right portion of the indicator 3. The microphone 66 is formed in the upper part of the indicator 3.

[0013]Power indicator PL, the cell lamp BL, the message lamp ML, etc. can also be provided in the lower part of the indicator 3.

[0014]Next, for example between the key A and the key B which are arranged the right-hand side in drawing 2 of the keyboard 5 on the main part 2, the jog dial 4 is attached so that the upper surface may become the almost same height as the key A and the key B. The jog dial 4 performs predetermined processing (for example, processing of scrolling of a screen) corresponding to the rotatably operating shown in the arrow a in drawing 3, and performs processing (for example, processing of the determination of selection of an icon) corresponding to the moving operation shown in the said figure Nakaya seal b.

[0015]The left lateral or right lateral of the indicator 3 which may arrange the jog dial 4 to the left lateral of the main part 2 and in which LCD7 was provided, Or it may arrange between the G key of the keyboard 5, and the H key in a lengthwise direction (namely, the jog dial 4 rotates in the direction of either the Y key or the B key like).

[0016]The jog dial 4 so that thumbably [operating the touchpad 6 by an index finger], It may arrange in the center section of the front face of the main part 2, and may arrange in a transverse direction along the upper bed edge or lower end edge of the touchpad 6, or may arrange between the right button of the touchpad 6, and the left button in a lengthwise direction. The jog dial 4 may be limited to neither a lengthwise direction nor a transverse direction, but may attach and arrange a predetermined angle to the oblique direction which is easy to operate it with each finger. In addition, the jog dial 4 can also be arranged in the thumbable position of the side of the mouse which is a pointing device. It is possible to use the rotary operation type electronic parts with a push switch for which this applicant and the common applicant applied and which are indicated by JP,8-203387,A as a jog dial.

[0017]It is equipped with the PC card which is an expansion card based on the standard as which

PCMCIA (Personal Computer Memory Card International Association) specifies the slot 9.

[0018]The IEEE(Institute of Electrical and Electronics Engineers) 1394 port 101, It has the structure based on the standard specified to IEEE1394, and the cable based on the standard specified to IEEE1394 is connected.

[0019]The memory stick slot 115 builds in semiconductor memory, such as a flash memory, and it is equipped with the memory stick (trademark) 116 which is a memory card which memorizes the data of a still picture, video, a sound, or a text.

[0020]Next, the composition of the 1 embodiment of the personal computer 1 is explained with reference to drawing 5.

[0021]The central processing unit (CPU (Central Processing Unit)) 51 comprises a Pentium (Pentium: trademark) processor made from Intel (Intel), etc., and is connected to the host bus 52, for example. Further, the bridge 53 (what is called a north bridge) is connected to the host bus 52, and the bridge 53, It has AGP(Accelerated Graphics Port) 50 and is connected to the PCI (Peripheral Component Interconnect/Interface) bus 56.

[0022]The bridge 53 comprises 400BX etc. which are AGP Host Bridge Controller made from Intel, for example, Transmission of the data of CPU51, RAM (Random-Access Memory)54 (what is called main memory), etc., etc. are controlled. The bridge 53 controls transmission of data with the video controller 57 via AGP50. What is called a chip set comprises this bridge 53 and bridge (what is called south bridge (PCI-ISA Bridge)) 58.

[0023]The bridge 53 is further connected also with the cache memory 55. The cache memory 55 comprises a memory which can perform operation of writing or read-out at a high speed more as compared with RAM, such as SRAM (Static RAM), 54, and carries out cash of the program or data which CPU51 uses (it memorizes temporarily).

[0024]CPU51 has-like (as compared with the cache memory 55, it is a memory which can operate at a high speed more, and CPU51 self controls) primary cache memory in the inside.

[0025]RAM54 comprises a DRAM (Dynamic RAM) and memorizes data required for the program which CPU51 executes, or operation of CPU51, for example. [when starting specifically completed RAM54, for example], The electronic mail program 54A, the auto pilot program 54B which were loaded from HDD67, The jog dial condition-monitoring program 54C, the jog dial driver 54D, operating program (OS)54E, the display program 54F, the reading program 54G, the other application programs 54H1, or 54Hn are memorized.

[0026]The display program 54F and the reading program 54G may be made to be started when the memory stick slot 115 is equipped with the memory stick 116.

[0027]The electronic mail program 54A is a program which delivers and receives correspondence (what is called an e-mail) via communication lines, such as the telephone line 76, etc. via the modem 75. The electronic mail program 54A has a received mail acquisition function. Processing which will be acquired if this received mail acquisition function checks whether the mail addressed to a user has received a message and the mail addressed to a user is in that mail box 79 to the mail server 78 which Internet Service Provider 77 has is performed.

[0028]The auto pilot program 54B is a program which starts two or more processings (or program) which were set up beforehand one by one, and processes them in the order set up beforehand.

[0029]The jog dial condition-monitoring program 54C displays on LCD7 what can be performed by operating the jog dial 4, when the notice of whether to support the jog dial 4 is received from each application program mentioned above and the jog dial 4 is supported.

[0030]The jog dial condition-monitoring program 54C detects the event (operation of the jog dial 4 rotating in the direction shown in the arrow a of drawing 3, or being pressed in the direction shown in the arrow b of drawing 3) of the jog dial 4, and performs processing corresponding to the detected event. The jog dial condition-monitoring program 54C has a list which receives the notice from an application program. The jog dial driver 54D performs a various function corresponding to operation of the jog dial 4.

[0031]OS(Operating System)54E, For example, it is a program which is represented by what is called MacOS (trademark) of what is called Windows (Windows)95 (trademark) of Microsoft Corp., Windows 98 (trademark), or Apple Computer, etc. and which controls fundamental operation of a computer.

[0032]the file (video.) memorized by MEMORISUTEI1KU 116 by which the MEMORISUTEI1KU slot 115 is equipped with the display program 54F. The thumbnail corresponding to the file which stores the data (it is also hereafter called contents) of a still picture, a sound, or a text is displayed on LCD7. The display program 54F operates the file memorized by MEMORISUTEI1KU 116 based on the thumbnail displayed on LCD7 (a copy, movement, elimination, etc.).

[0033]The reading program 67G supplies the data which reads the file memorized by MEMORISUTEI1KU with which the MEMORISUTEI1KU slot 115 is equipped, and is stored in the read file to the display program 54F.

[0034]The video controller 57 is connected to the bridge 53 via AGP50, and the data (image data or text data) supplied from CPU51 via AGP50 and the bridge 53 is received. The data which generated the image data corresponding to the received data, or was received is memorized as it is to the video memory to build in. The video controller 57 displays on LCD7 of the indicator 3 the picture corresponding to the image data memorized by video memory.

[0035]The sound controller 64 is connected to PCI bus 56. The sound controller 64 incorporates the signal corresponding to a sound from the microphone 66, generates the data corresponding to a sound, and outputs it to RAM54. Or the sound controller 64 drives the loudspeaker 65 and makes a sound output to the loudspeaker 65.

[0036]The modem 75 is connected to PCI bus 56. The modem 75 receives predetermined data from the communication network 80 or the mail server 78 while transmitting predetermined data to the communication network 80 or the mail servers 78, such as the Internet, via the dial-up line 76 and Internet Service Provider 77.

[0037]While supplying the data supplied from the interface card 112 with which the PC card interface 111 was connected to PCI bus 56, and the slot 9 was equipped to CPU51 or RAM54, The data supplied from CPU51 is outputted to the interface card 112. The drive 113 is connected to PCI bus 56 via the PC card interface 111 and the interface card 112.

[0038]The drive 113 reads the data currently recorded on the magnetic disk 121 with which it is equipped, the optical disc 122, the magneto-optical disc 123, or the semiconductor memory 124. The read data is supplied to RAM54 via the PC card interface 111, the interface card 112, and PCI bus 56.

[0039]The memory stick interface 114, It is connected to PCI bus 56, and while supplying the data supplied from the memory stick 116 with which the memory stick slot 115 was equipped to CPU51 or RAM54, the data supplied from CPU51 is outputted to the memory stick 116.

[0040]The bridge 58 (what is called a south bridge) is also connected to PCI bus 56. The bridge 58 comprises PIIX4E made from Intel, etc., for example, An IDE (Integrated Drive Electronics) controller / configuration registers 59, the timer circuit 60, IDE interface 61, and the USB interface 68 grade are built in. The device by which the bridge 58 is connected to the IDE bus 62, Or control etc. of the device connected via the ISA/EIO (Industry Standard Architecture /Extended Input Output) bus 63 or the I/O interface 69, Various kinds of I/O (Input /Output) is controlled.

[0041]An IDE controller / configuration registers 59, It comprises so-called two IDE controllers of a primary IDE controller and a secondary IDE controller, the configuration registers (configuration register), etc. (neither is illustrated).

[0042]HDD67 is connected to the primary IDE controller via the IDE bus 62. When other IDE buses are equipped with what is called IDE devices, such as a CD-ROM drive which is not illustrated or HDD, the IDE device with which it was equipped is electrically connected to a secondary IDE controller.

[0043]HDD67 The electronic mail program 67A, the auto pilot program 67B, Two or more application program 67H1 thru/or 67Hn, etc. of the display program 67F, the reading program 67G, and others are recorded as the jog dial condition-monitoring program 67C, the jog dial driver 67D, OS67E, and an application program. The electronic mail program 67A, the auto pilot program 67B which are recorded on HDD67, The jog dial condition-monitoring program 67C, the jog dial driver 67D, OS67E, the display program 67F, the reading program 67G and the application program 67H1 thru/or 67Hn, etc. are the processes of starting (boot rise) processing, are supplied to RAM54 one by one, and are loaded to it, for example.

[0044]USB interface 68 transmits data to the device connected via USB port 107, and it receives data from a device.

[0045]The timer circuit 60 supplies to CPU51 the data in which current time is shown corresponding to the demand of the display program 67F via PCI bus 56. The display program 67F is made [getting to know lapsed time etc. or] based on the data in which the current time supplied from the timer circuit 60 is shown.

[0046]The I/O interface 69 is further connected to the ISA/EIO bus 63. This I/O interface 69 comprises an ene BEDITTO controller, and ROM70, RAM71, and CPU72 are mutually connected in that inside.

[0047]ROM70 The IEEE1394 interface program 70A, The LED control program 70B, the touchpad input monitoring program 70C, the keystroke monitoring program 70D, the Wake rise program 70E, the jog dial condition-monitoring program 70F, etc. are memorized beforehand.

[0048]The IEEE1394 interface program 70A is received while transmitting the data (data stored in the packet) based on the standard specified by IEEE1394 via the IEEE1394 port 101. The LED control program 70B controls lighting of the message lamp ML or the lamp which consists of other LED power indicator PL, the cell lamp BL, and if needed. The touchpad input monitoring program 70C is a program which supervises the input from the touchpad 6 corresponding to a user's operation.

[0049]The keystroke monitoring program 70D is a program which supervises the input from the keyboard 5 or other key switches. When it is checked for the Wake rise program 70E the time set up beforehand based on the data in which the current time supplied from the timer circuit 60 of the bridge 58 is shown and the set-up time comes, In order to start predetermined processing (or program) etc., it is a program which manages the power supply of each chip which constitutes the personal computer 1. The jog dial condition-monitoring program 70F is a program for always supervising whether whether the rotary type encoder of the jog dial 4 having rotated and the jog dial 4 were pushed.

[0050]BIOS(Basic Input/Output System (basic input/output system))70G is further written in ROM70. BIOS70G controls delivery (input and output) of data between OS or an application program, and peripheral equipment (the touchpad 6, the keyboard 5, or HDD67 grade).

[0051]RAM71 has each register for LED control, a touchpad input status, keystroke status, or setting-out time, an I/O register for jog dial condition monitoring, or an IEEE1394I/F register as the registers 71A thru/or 71F. For example, when the jog dial 4 is pushed and the electronic mail program 54A is started, a predetermined value is stored and, as for a LED control register, lighting of the message lamp ML is controlled corresponding to the value stored. As for a keystroke status register, press of the jog dial 4 will store a predetermined operation key flag. Predetermined time is set up corresponding to operation of the keyboard 5 according [a setting-out time register] to a user etc.

[0052]Via the connector to which this I/O interface 69 abbreviated the graphic display, the jog dial 4, the touchpad 6, the keyboard 5, and IEEE1394 port 101 grade are connected -- the jog dial 4, the touchpad 6, or the keyboard 5 -- it is alike, respectively and the signal corresponding to operation of receiving is outputted to the ISA/EIO bus 63. The I/O interface 69 controls transmission and reception of data with the apparatus connected via the IEEE1394 port 101. Power indicator PL, the cell lamp BL, the message lamp ML, the control circuit 73, and the lamp that consists of other LED are connected to the I/O interface 69.

[0053]The control circuit 73 performs control for charge of the second battery of the built-in battery 74 or peripheral equipment while it is connected to the built-in battery 74 or the AC power and it supplies a power supply required for each block. The I/O interface 69 is supervising the electric power switch 8 operated when a power supply is one [a power supply] or turned off.

[0054]The I/O interface 69 executes the IEEE1394 interface program 70A thru/or the jog dial condition-monitoring program 70F also in the state of OFF of a power supply according to the power supply provided in the inside. That is, the IEEE1394 interface program 70A thru/or the jog dial condition-monitoring program 70F are always operating.

[0055]Therefore, even when the electric power switch 8 is off and CPU51 is not performing OS54E,

the I/O interface 69, Since the jog dial condition-monitoring program 70F is executed, when the jog dial 4 is pressed in the state of a power saving state or power OFF, the personal computer 1 starts the predetermined software or the processing of a script file set up beforehand, for example.

[0056] Thus, in the personal computer 1, since the jog dial 4 has a programmable power key (PPK) function, it is not necessary to provide a key for exclusive use.

[0057] Drawing 6 is a figure explaining the composition which is the display program 54F and the reading program 54G which the personal computer 1 executes. The display program 54F contains the processing manager 151, the contents manipulation routine 152-1 or 152-N and the icon manipulation routine 153-1 thru/or manipulation routines, such as 153-N.

[0058] The processing manager 151 computes the position etc. which display the thumbnail corresponding to the file read from the memory stick 116 based on the input event etc. which were supplied from the touchpad 6 or OS54E, and supplies the contents manipulation routine 152-1 thru/or 152-N. The processing manager 151 the display position of the thumbnail supplied to the contents manipulation routine 152-1 thru/or 152-N. On LCD7, it adds to the position of right and left and the upper and lower sides, and depth (when a virtual distance from the surface of LCD7 is shown and thumbnails overlap, a size in case which thumbnail is displayed or a thumbnail displays is determined) is included.

[0059] The processing manager 151 controls the cycle of a display of the thumbnail of the contents manipulation routine 152-1 thru/or 151-N.

[0060] The processing manager 151 computes the position etc. which display an icon based on the input event etc. which were supplied from the touchpad 6 or OS54E, and supplies the icon manipulation routine 153-1 thru/or 153-N. The processing manager 151 controls the cycle of a display of the icon of the icon manipulation routine 153-1 thru/or 153-N.

[0061] The processing manager 151 directs displaying conditions (the display position of a thumbnail, the cycle of a display, the color of a picture, etc.) to the contents manipulation routine 152-1 thru/or 152-N based on the input event etc. which were supplied from the touchpad 6 or OS54E.

[0062] The processing manager 151 demands processing of the copy and deletion to the file corresponding to the thumbnail which the contents manipulation routine 152-1 thru/or 152-N show, or transmission of OS54E corresponding to the input of the touchpad 6 etc.

[0063] The number corresponding to the number corresponding to the file which read the contents manipulation routine 152-1 thru/or 152-N from the memory stick 116 corresponding to the demand from the reading program 54G is started.

[0064] For example, when reading of four files from the memory stick 116 by the reading program 54G is completed, the reading program 54G requires the contents manipulation routine 152-1 thru/or starting of 152-4. For example, when reading of eight files from the memory stick 116 by the reading program 54G is completed, the reading program 54G requires the contents manipulation routine 152-1 thru/or starting of 152-8.

[0065] Thus, the contents manipulation routine 152-1 of a number thru/or 152-N corresponding to the file which reading by the reading program 54G from the memory stick 116 ended is started. Actually, when the display program 54F carries out repeat execution of the routine of only the predetermined number of's times contents processing of one routine, it seems that the contents manipulation routine 152-1 thru/or the 152-N are operating.

[0066] The contents manipulation routine 152-1 displays on LCD7 one thumbnail corresponding to one file read from the memory stick 116 based on the processing manager's 151 directions. The contents manipulation routine 152-2 displays on LCD7 one thumbnail corresponding to one file read from the memory stick 116 based on the processing manager's 151 directions. Each of the contents manipulation routine 152-3 thru/or 152-N displays on LCD7 similarly one thumbnail corresponding to one file read from the memory stick 116 based on the processing manager's 151 directions.

[0067] Thus, each of the contents manipulation routine 152-3 thru/or 152-N displays one thumbnail on LCD7 based on the processing manager's 151 directions, respectively.

[0068] The number corresponding to the number corresponding to the icon which the icon manipulation routine 153-1 thru/or 153-N mention later is started.

[0069] The icon manipulation routine 153-1 displays one icon on LCD7 based on the processing

manager's 151 directions. The icon manipulation routine 153-2 displays other one icon on LCD7 based on the processing manager's 151 directions. Each of the icon manipulation routine 153-3 thru/or 153-N displays one icon different, respectively on LCD7 similarly based on the processing manager's 151 directions.

[0070]Thus, each of the icon manipulation routine 153-1 thru/or 153-N displays one icon on LCD7 based on the processing manager's 151 directions, respectively.

[0071]When reading of one file from the memory stick 116 ends the reading program 54G, The data stored in the file at either the contents manipulation routine 152-3 which was made to start any one of the contents manipulation routine 152-3 thru/or the 152-N, and was started thru/or 152-N is supplied.

[0072]When the reading program 54G reads a file from the communication networks 80, such as the Internet, It may be made to supply the data stored in the file at either the contents manipulation routine 152-3 which was made to start any one of the contents manipulation routine 152-3 thru/or the 152-N, and was started thru/or 152-N.

[0073]Hereafter, when it is not necessary to distinguish the contents manipulation routine 152-3 thru/or 152-N separately, the contents manipulation routine 152 is only called. It may be made to perform the contents manipulation routine 152-3 thru/or 152-N as a different task performed in parallel, respectively. Hereafter, when it is not necessary to distinguish the icon manipulation routine 153-1 thru/or 153-N separately, the icon manipulation routine 153 is only called.

[0074]Hereafter, corresponding to the operation to the personal computer 1 assumed as normal operation, the screen which the display program 54F displays on LCD7 is explained in order.

[0075]Drawing 7 thru/or drawing 9 are the figures explaining the screen displayed on LCD7, when the memory stick slot 115 is equipped with the memory stick 116 ten files are remembered to be for example, and the display program 54F starts.

[0076]When one file is read from the memory stick 116, the reading program 54G starts the one contents manipulation routine 152, and displays the thumbnail corresponding to the data stored in the file read into the display program 54F.

[0077]After starting of the display program 54F, drawing 7 is a figure showing the example of the screen which the display program 54F displays on LCD7, when reading of three of ten files from the memory stick 116 by the reading program 54G is completed.

[0078]The thumbnail 201-1 is displayed by the contents manipulation routine 152-1, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the beginning from the memory stick 116. The thumbnail 201-2 is displayed by the contents manipulation routine 152-2, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 2nd from the memory stick 116. The thumbnail 201-3 is displayed by the contents manipulation routine 152-3, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 3rd from the memory stick 116.

[0079]The thumbnail 201-1 thru/or 201-3 are arranged on the spiral of imagination so that it may mention later. Hereafter, when it is not necessary to distinguish the thumbnail 201-1 thru/or 201-N separately, the thumbnail 201 is only called.

[0080]The contents manipulation routine 152 generates the thumbnail 201 corresponding to the kind of data supplied from the reading program 54G.

[0081]For example, the contents manipulation routine 152 generates the thumbnail 201 based on the picture of the beginning of video, when the data of video is supplied from the reading program 54G.

[0082]The contents manipulation routine 152 generates the thumbnail 201 from the data of a still picture, when the data of the still picture of TIFF (Tag Image File Format) or a GIF (Graphic Interchange Format) method is supplied. The contents manipulation routine 152 uses the data of the thumbnail stored in the header, when the data of the still picture of a JPEG (Joining Photographic Experts Group) method is supplied.

[0083]When the data of a sound or a text is supplied from the reading program 54G, based on the data of a sound or a text, the contents manipulation routine 152 generates a picture and uses it as the thumbnail 201. The contents manipulation routine 152 mentions later the processing which

generates the picture as the thumbnail 201 corresponding to audio data or the data of a text.
 [0084]The icon for directing arrangement of the thumbnail 201 is displayed on the screen bottom which the display program 54F displays on LCD7. The icon 202-1 is an icon for directing the display arranged on the straight line of imagination of the thumbnail 201 to the display program 54F. The icon 202-2 is an icon for directing the display arranged on the circumference of the perfect circle of imagination of the thumbnail 201, or an ellipse to the display program 54F. The icon 202-3 is an icon for directing the display which arranges the thumbnail 201 in the shape of a lattice to the display program 54F. The icon 202-4 is an icon for directing the display arranged on the spiral of imagination of the thumbnail 201 to the display program 54F.

[0085]Since the icon 202-4 is selected and it is arranged in the center of the bottom of a screen, the display program 54F is arranged on the thumbnail 201-1 thru/or the spiral of imagination of 201-3. Hereafter, when it is not necessary to distinguish the icon 202-1 thru/or 202-4 separately, the icon 202 is only called.

[0086]The processing to the file corresponding to [as for the display program 54F, the jog dial 4, the keyboard 5, or the touchpad 6 is operated, and] the thumbnail 201-1 thru/or 201-3, For example, when an enlarged display, reproduction, presenting of attribution information, copy, deletion, transmission, etc. are required, processing to the file corresponding to the thumbnail 201-3 thru/or 201-1 is performed. For example, the processing manager 151 demands processing of the copy and deletion to the file corresponding to the thumbnail 201-3 thru/or 201-1, or transmission of OS54E corresponding to the input of the touchpad 6 etc.

[0087]After starting of the display program 54F, drawing 8 is a figure showing the example of the screen which the display program 54F displays on LCD7, when reading of seven of ten files from the memory stick 116 by the reading program 54G is completed.

[0088]The thumbnail 201-4 is displayed by the contents manipulation routine 152-4, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 4th from the memory stick 116. The thumbnail 201-5 is displayed by the contents manipulation routine 152-5, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 5th from the memory stick 116.

[0089]The thumbnail 201-6 is displayed by the contents manipulation routine 152-6, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 6th from the memory stick 116. The thumbnail 201-7 is displayed by the contents manipulation routine 152-7, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 7th from the memory stick 116.

[0090]The thumbnail 201-1 thru/or 201-7 are arranged on the spiral of imagination.

[0091]The processing to the file corresponding to [as for the display program 54F, the jog dial 4, the keyboard 5, or the touchpad 6 is operated, and] the thumbnail 201-1 thru/or 201-7, For example, when an enlarged display, reproduction, presenting of attribution information, copy, deletion, transmission, etc. are required, processing to the file corresponding to the thumbnail 201-7 thru/or 201-1 is performed. For example, the processing manager 151 demands processing of the copy and deletion to the file corresponding to the thumbnail 201-7 thru/or 201-1, or transmission of OS54E corresponding to the input of the touchpad 6 etc.

[0092]After starting of the display program 54F, drawing 9 is a figure showing the example of the screen which the display program 54F displays on LCD7, when reading of all the files from the memory stick 116 by the reading program 54G is completed.

[0093]The thumbnail 201-8 is displayed by the contents manipulation routine 152-8, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 8th from the memory stick 116. The thumbnail 201-9 is displayed by the contents manipulation routine 152-9, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 9th from the memory stick 116. The thumbnail 201-10 is displayed by the contents manipulation routine 152-10, and comprises a picture corresponding to the data stored in the file which the reading program 54G read into the 10th from the memory stick 116.

[0094]The thumbnail 201-1 thru/or 201-10 are arranged on the spiral of imagination.

[0095]The processing to the file corresponding to [as for the display program 54F, the jog dial 4, the keyboard 5, or the touchpad 6 is operated, and] the thumbnail 201-1 thru/or 201-10, For example, when an enlarged display, reproduction, presenting of attribution information, copy, deletion, transmission, etc. are required, processing to the file corresponding to the thumbnail 201-10 thru/or 201-1 is performed. For example, the processing manager 151 demands processing of the copy and deletion to the file corresponding to the thumbnail 201-10 thru/or 201-1, or transmission of OS54E corresponding to the input of the touchpad 6 etc.

[0096]Thus, since the display program 54F will display the thumbnail 201 corresponding to the data stored in the read file in order if the reading program 54G reads a file from the memory stick 116, The user of the personal computer 1 can know the contents of the file memorized by the memory stick 116, and the state of reading of the file in the time.

[0097]The display program 54F will perform processing required of the processing to the file read at the time corresponding to the demand, if the reading program 54G reads a file from the memory stick 116.

[0098]Since reading of a file displays in order the thumbnail 201 corresponding to the data stored in the file which the display program 54F read at the latest, the user can opt for the operation performed to the next based on the displayed thumbnail 201.

[0099]To the file corresponding to the thumbnail 201-3 thru/or 201-1 in the state which shows in drawing 7, the processing which can be performed, It is the same as that of the processing which can be performed to the file corresponding to the thumbnail 201-10 thru/or 201-1 in the state of indicating it in drawing 9 as the processing which can be performed to the file corresponding to the thumbnail 201-7 thru/or 201-1 in the state which shows in drawing 8.

[0100]Next, the thumbnail 201 which displays a sound or the picture corresponding to the data of a text is explained. As shown in the left-hand side of drawing 10, the icon corresponding to the sound currently recorded beforehand, etc. were displayed conventionally. In this case, even if it gave an indication corresponding to the data of two or more sounds, the same icon was only displayed corresponding to that number.

[0101]On the other hand, as shown in the right-hand side of drawing 10, the display program 54F generates the picture corresponding to a sound or the data of a text itself, and displays it as the thumbnail 201.

[0102]Drawing 11 is a figure with which the contents manipulation routine 152 explains the procedure which generates the thumbnail 201 which displays the picture corresponding to audio data.

[0103]First, the contents manipulation routine 152 sets up the field which the thumbnail 201 displays corresponding to the size of the thumbnail 201 to display. The contents manipulation routine 152 divides the field which the thumbnail 201 displays into the field of the rectangle which comprises a predetermined number of pixels corresponding to the size of audio data.

[0104]The contents manipulation routine 152 extracts the data (for example, data etc. which are located in the center of a data row when audio data is seen as a data row) of arbitrary portions from audio data, and generates the pixel value of a pixel based on the extracted data. For example, the contents manipulation routine 152 cuts down data in an 8-bit unit from audio data, and regards it as the data of RGB.

[0105]In the example of drawing 11, 0fh (finally the numerical value expressed in hexadecimal numbers attaches h hereafter) started from audio data is used as the data of R, 7eh is used as the data of G, and the data of the 57 h B is carried out. Similarly, in the data following 0fh, 7eh, and 57 h, 12 h is used as the data of R, and 25 h is used as the data of G, and let 98 h be data of B.

[0106]The contents manipulation routine 152 generates the data of RGB from the data of the sound ** and coded [encipher or] which does not process decoding etc., when audio data is enciphered or coded.

[0107]Thus, the contents manipulation routine 152 generates the pixel value of same number as the number of the fields where the thumbnail was divided of data of RGB, etc.

[0108]The contents manipulation routine 152 sets the data of RGB as each of the field of the rectangle which comprises a predetermined number of pixels which divided the field which the

thumbnail 201 displays. At this time, the thumbnail 201 comprises a picture of a different color for every rectangle, as an example is shown in the picture 1 of drawing 11.

[0109]The contents manipulation routine 152 applies the Buller processing (the so-called processing of a shading off) to the thumbnail 201 to which the data of RGB was set. By obscuring the thumbnail 201 to which the data of RGB was set, as an example is shown in the picture 2 of drawing 11, it is effective in the displayed thumbnail 201 becoming legible.

[0110]Which image processing, such as not only processing of a shading off but embossing and outline extraction, may be sufficient as the processing added to the thumbnail 201 to which the data of RGB was set.

[0111]Further, the contents manipulation routine 152 overwrites a position in a text, as an example is shown for the data of attributes, such as a title contained in the audio file, an artist name, or regeneration time, in the picture 3 of drawing 11.

[0112]Since the contents manipulation routine 152 overwrites in a text the data of attributes, such as a title contained in the audio file, an artist name, or regeneration time, The user who looked at the thumbnail 201 corresponding to audio data can know the contents of the data of the sound corresponding to the thumbnail 201 still in detail.

[0113]It may be made to generate the picture set as the thumbnail 201 based on the spectrum over audio data. For example, the color (for example, -40 dB is made to correspond to the color of 0 times of a hue circle, and 0 dB is made to correspond to the color of 360 degrees of a hue circle) corresponding to the level of each frequency band is set as the pixel of the row beside the thumbnail 201. By making the row of the length of the thumbnail 201 correspond to audio lapsed time, the picture corresponding to the lapsed time of the audio spectrum can be set as the thumbnail 201 whole.

[0114]As shown in drawing 12, the contents manipulation routine 152 divides into the field of a small number of rectangle the field which displays the thumbnail 201 when audio data is small, and when audio data is large, it divides into the field of many rectangles the field which displays the thumbnail 201.

[0115]By doing in this way, the user of the personal computer 1 only looked at the thumbnail 201 corresponding to audio data, and can predict the size of audio data.

[0116]As shown in drawing 13, the contents manipulation routines 152 are a procedure which generates the thumbnail 201 corresponding to audio data, and the same procedure, and generate the thumbnail 201 based on the data of a text. In this case, the contents manipulation routine 152 extracts the text of the main point when the text contained in the data of a text was beforehand defined as a text displayed on the contents 201, and it may be made to display it.

[0117]Thus, the display program 54F can generate the thumbnail 201 corresponding to audio data or the data of a text.

[0118]The display program 54F not only in audio data or the data of a text, Corresponding to the data which does not include a picture, for example, the data stored in the HTML (Hypertext Markup Language) file, the data for a spreadsheet, or an execution program (load module), the thumbnail 201 is generable.

[0119]Next, arrangement of the thumbnail 201 which the display program 54F displays is explained.

[0120]When displaying the information attached to a thumbnail and a thumbnail conventionally, as shown in drawing 14, it was common to arrange so that a thumbnail may not be lapped, and to have displayed the information which is attached to the neighborhood at a thumbnail.

[0121]on the other hand, the method of presentation (a square view is called hereafter) arranged in the shape of a lattice so that the display program 54F of the personal computer 1 may not lap the thumbnail 201 -- in addition, it has a gestalt of three kinds of displays which pile up and display the thumbnail 201.

[0122]In the gestalt of the 1st display, the straight line or curve (open line) of imagination is specified, and the thumbnail 201 is arranged on the straight line of imagination, or a curve (a line view is called hereafter). In the gestalt of the 2nd display, the perfect circle or ellipse (closed line) of imagination is specified, and the thumbnail 201 is arranged at the perfect circle or ellipse of imagination (a loop view is called hereafter). In the gestalt of the 3rd display, the spiral of

imagination is specified and the thumbnail 201 is arranged at the spiral of imagination (a spiral view is called hereafter).

[0123]First, the line view displayed when it clicks on the icon 202-1 is explained. As shown in drawing 15, the display program 54F specifies the axis 221-1 which consists of a straight line or a curve, and arranges the thumbnail 201-1 thru/or 201-3 based on the axis 221-1. When the thumbnail 201-1 is chosen and the thumbnail 201-1 and the thumbnail 201-2 lap, the display program 54F displays the whole thumbnail 201-1, and displays only the portion which does not lap with the thumbnail 201-1 of the thumbnail 201-2.

[0124]When the thumbnail 201-1 is chosen, the thumbnail 201-1 thru/or 201-3 are arranged in order and the thumbnail 201-2 and the thumbnail 201-3 lap. The display program 54F displays only the portion which does not lap with the thumbnail 201-1 of the thumbnail 201-2, and displays only the portion which does not lap with the thumbnail 201-2 of the thumbnail 201-3.

[0125]Namely, the display program 54F displays the whole thumbnail 201 chosen, the thumbnail 201 near the thumbnail 201 chosen from the thumbnail 201 which is separated from the thumbnail 201 chosen -- being preferential (it arranges in the position near a user -- as) -- it displays.

[0126]The text 211-1 in which the size etc. of the information which accompanies the data corresponding to the thumbnail 201-1, for example, a file name, a creation date, and a picture are shown is arranged on the axis 221-2 the position of the thumbnail 201-1 bottom and whose position of the text 211-1 upper part correspond, for example. The text 211-2 in which the information which accompanies the data corresponding to the thumbnail 201-2, for example, a file name etc., is shown is arranged on the axis 221-2 the position of the thumbnail 201-2 bottom and whose position of the text 211-2 upper part correspond, for example. The text 211-3 in which the information which accompanies the data corresponding to the thumbnail 201-3, for example, a file name etc., is shown is arranged on the axis 221-2 the position of the thumbnail 201-3 bottom and whose position of the text 211-3 upper part correspond, for example.

[0127]The axis 221-1 and the axis 221-2 are not displayed on the screen of LCD7. Hereafter, when it is not necessary to distinguish the axis 221-1 and the axis 221-2 separately, the axis 221 is only called. Hereafter, when it is not necessary to distinguish the text 211-1 thru/or 211-3 separately, the text 211 is only called.

[0128]For example, when the horizontal direction of a x axis and a screen is made the horizontal direction of a screen into the y-axis, as it is shown in drawing 16, the axis 221-1 is computed by a formula (1), and the axis 221-2 is computed by a formula (2).

[0129]

$$x = \sin(\pi/2t) (y - c_0) + c_1 \quad (1)$$

$$x = -\sin(\pi/2t) (y - c_0) + c_1 \quad (2)$$

Here, x shows the coordinates on a x axis and y shows the coordinates on the y-axis. t is the lapsed time from predetermined reference time (for example, time when a display is started with a line view), and c0 and c1 show the position of the center of the thumbnail chosen.

[0130]theta shown in drawing 16 corresponds to $\pi/2t$ of a formula (1) or a formula (2).

[0131]Therefore, when a display is started for example, by arrangement of the thumbnail 201 and the text 211 which are shown in drawing 17 (B) based on the position of the axis 221-1 and the axis 221-2 which are shown in drawing 17 (A), The position of the axis 221-1 and the axis 221-2 moves smoothly toward the position shown in drawing 17 (C), and moves smoothly further toward the position shown in drawing 17 (E).

[0132]That is, corresponding to movement of the axis 221-1 and the axis 221-2, the thumbnail 201 and the text 211 move smoothly toward the arrangement shown in drawing 17 (D) from the arrangement shown in drawing 17 (B), and move to the arrangement shown in drawing 17 (F) smoothly further.

[0133]When the position shown in drawing 17 (E) is reached, the position of the axis 221-1 and the axis 221-2 moves smoothly toward the position shown in drawing 17 (C), moves smoothly further toward the position shown in drawing 17 (A), and repeats movement smoothly.

[0134]Namely, the thumbnail 201 and the text 211, Corresponding to movement of the axis 221-1 and the axis 221-2, it moves smoothly toward the arrangement shown in drawing 17 (D) from the

arrangement shown in drawing 17 (F), and moves to the arrangement shown in drawing 17 (B) smoothly further, and movement is repeated smoothly as mentioned above.

[0135] Since the thumbnail 201 chosen as the center of movement of the axis 221-1 is arranged, Since the thumbnail 201 which the user has chosen does not move but the thumbnail 201 arranged at the upper and lower sides moves, the user can recognize the chosen thumbnail 201 promptly and certainly.

[0136] Next, the loop view displayed when it clicks on the icon 202-2 is explained. As shown in drawing 18, the display program 54F specifies a perfect circle, an ellipse, or the axis 241-1 that comprises a predetermined loop (a polygon is included), and arranges the thumbnail 201-1 thru/or 201-5 based on the axis 241-1. When the thumbnail 201-3 is chosen and the thumbnail 201-3 and the thumbnail 201-2 lap, the display program 54F displays the whole thumbnail 201-3, and displays only the portion which does not lap with the thumbnail 201-3 of the thumbnail 201-2.

[0137] When the thumbnail 201-3 is chosen, the thumbnail 201-1 thru/or 201-5 are arranged in order and the thumbnail 201-2 and the thumbnail 201-1 lap, The display program 54F displays only the portion which does not lap with the thumbnail 201-3 of the thumbnail 201-2, and displays only the portion which does not lap with the thumbnail 201-2 of the thumbnail 201-1. The display program 54F displays only the portion which does not lap with the thumbnail 201-3 of the thumbnail 201-4, and displays only the portion which does not lap with the thumbnail 201-4 of the thumbnail 201-5.

[0138] Namely, the display program 54F displays the whole thumbnail 201 chosen, the thumbnail 201 near the thumbnail 201 chosen from the thumbnail 201 which is separated from the thumbnail 201 chosen -- being preferential (it arranges in the position near a user -- as) -- it displays.

[0139] The display program 54F specifies the axis 241-2 corresponding to the axis 241-1. The text 211-1 corresponding to the thumbnail 201-1 is arranged on the axis 241-2 the position of the center of the right and left of the thumbnail 201-1 and whose position of the center of the text 211-1 correspond, for example. The text 211-2 corresponding to the thumbnail 201-2 is arranged on the axis 241-2 the position of the center of the right and left of the thumbnail 201-2 and whose position of the center of the text 211-2 correspond. Similarly the text 211-3 respectively corresponding to the thumbnail 201-5 thru/or 201-3 thru/or each of 211-5, It is arranged on the axis 241-2 the position of the center of each right and left and whose position of the text 211-3 thru/or the center of 211-5 correspond with the thumbnail 201-3 thru/or 201-5.

[0140] The axis 241-1 and the axis 241-2 are not displayed on the screen of LCD7. Hereafter, when it is not necessary to distinguish the axis 241-1 and the axis 241-2 separately, the axis 241 is only called.

[0141] The display program 54F is displayed on LCD7 focusing on the thumbnail 201 arranged at the axis 241-1, and the thumbnail 201 chosen among the texts 211 arranged at the axis 241-2, as shown in drawing 19.

[0142] Drawing 20 is a figure explaining the processing which computes the axis 241-1 and the axis 241-2 of the display program 54F in case the axis 241-1 and the axis 241-2 are circles.

[0143] When the number of the thumbnails 201 to display is set to n, the radius r of the circle corresponding to the axis 241-1 and the axis 241-2 is called for by a formula (3).

[0144]

$$r = 64n / 2\pi \quad (3)$$

64 contained in a formula (3) is a constant corresponding to the interval of a thumbnail.

[0145] When the coordinates of the center of a screen are set to (Xcent, Ycent), the coordinates (Xcent1, Ycent1) of the center of the axis 241-1 are shown by the formula (4), and the coordinates (Xcent2, Ycent2) of the center of the axis 241-2 are shown by the formula (5).

[0146]

$$(Xcent1, Ycent1) = (Xcent, Ycent - r) \quad (4)$$

$$(Xcent1, Ycent1) = (Xcent, Ycent + r) \quad (5)$$

The position of the i-th thumbnail 201 is searched for by a formula (6).

[0147]

$$(X1i, Y1i) = (Xcent1 + r \sin(i * 2\pi / n), Ycent1 + r \cos(i * 2\pi / n)) \quad (6)$$

The position of the i-th text 211 is searched for by a formula (7).

[0148]

$$(X2i, Y2i) = (Xcent2 + r \sin(i * 2 \pi / n), Ycent2 - r \cos(i * 2 \pi / n)) \quad (7)$$

In a loop view, when the display program 54F changes arrangement of the thumbnail 201 corresponding to operation of the jog dial 4, there is an advantage that a user tends to grasp movement of the thumbnail 201 intuitively.

[0149]Next, the spiral view displayed when it clicks on the icon 202-4 is explained. As shown in drawing 21, the display program 54F specifies the axis 261 which consists of spirals, and arranges the thumbnail 201-1 thru/or 201-3 and the text 211-1 thru/or 221-3 based on the axis 261. The axis 261 has a position of a depth direction to a screen. Even if the thumbnail 201 is the same size, the size displayed on LCD7 will change with positions arranged.

[0150]Since it is arranged at a position with the shortest distance from a screen, the thumbnail 201 chosen is displayed greatly. The display program 54F is smaller displayed as compared with the thing which displays the thumbnail 201 chosen greatly and is having the thumbnail 201 which is not chosen chosen.

[0151]Therefore, since the display program 54F displays small the thumbnail 201 to which the user is not observing the thumbnail 201 which the user is observing greatly, displaying many thumbnails 201, the screen of LCD7 is used more efficiently.

[0152]Or the display program 54F specifies the axis 261-1 and the axis 261-2 which comprise the spiral which has the same axis, and arranges the thumbnail 201 based on the axis 261-1, and it may be made to arrange the text 211 based on the axis 261-2 for example, as shown in drawing 22 (A).

[0153]The coordinates (x, y, z) of the axis 261 to which a radius changes from the spiral which is r are searched for by the formula (8), the formula (9), and a formula (10).

[0154]

$$x = r \sin(t) + c_0 t \quad (8)$$

$$y = c_1 t \quad (9)$$

$$z = r \cos(t) \quad (10)$$

r is a spiral radius, c₀ and c₁ are constants which determine inclination of a spiral here, and t is any value.

[0155]As shown in drawing 23, the coordinates (xi, yi, zi) of the thumbnail 201 arranged on the axis 261 to which a radius changes from the spiral which is r are searched for by the formula (11), the formula (12), and a formula (13).

[0156]

$$x_i = Xcent + r \sin(i * 2 \pi / 9) \quad (11) - (i * r / 20)$$

$$y_i = Ycent + (i * r / 10) \quad (12)$$

$$z_i = r \cos(i * 2 \pi / 9) \quad (13)$$

Here, Xcent and Ycent show the coordinates of the center of a screen. The z-axis is an axis of coordinates right-angled to a x axis and the y-axis corresponding to depth to a screen. 20 of a formula (11) and 10 of a formula (12) are predetermined constants.

[0157]Next, the square view displayed when it clicks on the icon 202-3 is explained. As shown in drawing 24 and drawing 25, for example as a sequence of the top of a screen, the position of the display program 54F of each center of a sliding direction corresponds, and it arranges the five thumbnails 201-1 thru/or 201-5 so that the interval of a lateral center position may become a predetermined distance.

[0158]As 2nd sequence of a screen, the position of the display program 54F of each center of a sliding direction corresponds, and it arranges the five thumbnails 201-6 thru/or 201-10 so that the interval of a lateral center position may become a predetermined distance. In other words, the center position of the transverse direction of the thumbnail 201-6 is in agreement with the center position of the transverse direction of the thumbnail 201-1. The center position of the transverse direction of the thumbnail 201-7 is in agreement with the center position of the transverse direction of the thumbnail 201-2. The center position of the transverse direction of the thumbnail 201-8 is in agreement with the center position of the transverse direction of the thumbnail 201-3. In accordance with the center position of the transverse direction of the thumbnail 201-4, the center

position of the transverse direction of the thumbnail 201-9 so that the center position of the transverse direction of the thumbnail 201-10 may be in agreement with the center position of the transverse direction of the thumbnail 201-5, The display program 54F arranges the five thumbnails 201-6 thru/or 201-10 in the 2nd sequence of a screen.

[0159]The display program 54F is the same processing as the 3rd sequence of a screen, and 4th sequence, and arranges the thumbnail 201-11 thru/or 201-20.

[0160]The display program 54F can rearrange the thumbnail 201 based on the size of a creation date, photographing time, a file name, and a picture, etc. in a line view, a loop view, a spiral view, or a square view.

[0161]Next, movement of the icon 202 when it clicks on the icon 202 is explained. Drawing 26 is a figure explaining the example of movement of the icon 202.

[0162]When the icon 202-1 thru/or 202-3 are arranged on the screen as shown in the right-hand side of drawing 26 for example, and it clicks on the icon 202-1, While making the shape or the color of the icon 202-1 change and reproducing a predetermined sound, the display program 54F moves the icon 202-1 and the icon 202-2 so that the position of the icon 202-1 and the position of the icon 202-2 may be made to change.

[0163]That is, when the touchpad 6 is clicked, the processing manager 151 is a predetermined cycle, and he computes the position of the icon 202-1, and the position of the icon 202-2 so that the icon 202-1 and the icon 202-2 may move.

[0164]Based on the position which the processing manager 151 computed, the icon manipulation routine 153-1 displays the icon 202-1 so that it may be made to move in the center of a screen. Based on the position which the processing manager 151 computed, the icon manipulation routine 153-2 displays the icon 202-2 so that it may be made to move to the lower left of a screen.

[0165]It may be made for the icon 202-1 thru/or movement of 202-3 to move not only in linear movement but in a predetermined curve top. It may be made for the icon 202-1 thru/or the direction of movement of 202-3 to include a depth direction not only to the same flat-surface top as the screen to display but to a screen.

[0166]When the thumbnail 201 is displayed by the loop view, as shown in drawing 27 (A), the display program 54F arranges the icon 202-2 in the center of the longitudinal direction of a screen. In the state which shows in drawing 27 (A), when it clicks on the icon 202-1, by a user, the display program 54F is the speed which can be checked visually, and moves the icon 202-1 thru/or 202-4. Through the state which shows in drawing 27 (B), the display program 54F arranges the icon 202-1 in the center of the longitudinal direction of a screen, as shown in drawing 27 (C).

[0167]The display program 54F arranges the icon 202-2 thru/or each of 202-4 based on the numerical value connected with the icon 202-2 thru/or each of 202-4.

[0168]For example, when 1 is matched with the icon 202-1, 2 is matched with the icon 202-2, 3 is matched with the icon 202-3 and 4 is matched with the icon 202-4, The display program 54F arranges the icon 202-2 thru/or 202-4 from the left-hand side of a screen in order with a small numerical value matched. That is, the display program 54F arranges the icon 202-2 on the left-hand side of a screen, arranges the icon 202-3 on the right-hand side of the icon 202-2, and arranges the icon 202-4 on the right-hand side of the icon 202-3.

[0169]Thus, when the display program 54F moves the icon 202 and arranges the icon 202 corresponding to the mode of a display in the center of a screen, for example, a user, It can know certainly that operation was added to the icon 202, and the mode of a display of the thumbnail 201 can be known promptly.

[0170]Next, the display of the afterimage accompanying movement of the thumbnail 201 or the icon 202 is explained. The contents manipulation routine 152 draws the thumbnail 202 30 times in 1 second, for example. As shown in drawing 28, the contents manipulation routine 152 displays the afterimage corresponding to the last drawing on a screen, when moving the thumbnail 202.

[0171]When the display of the afterimage is not set up, the contents manipulation routine 152 eliminates the present screen, and newly draws the thumbnail 202.

[0172]As an example is shown in drawing 29, when the display of the afterimage is set up and the thumbnail 202 is drawn, the contents manipulation routine 152 sets up the brightness of the screen

displayed last time to 80%, for example, and draws. The contents manipulation routine 152 describes with brightness overwriting the thumbnail 202 on the screen set up to 80%.

[0173]Therefore, since the contents manipulation routine 152 lowers the brightness of the screen drawn last time to the degree of drawing and draws when the thumbnail 202 is moved, an afterimage will be displayed. By performing such processing, the display program 54F can display an afterimage with a smaller operation amount.

[0174]Drawing 30 is a figure explaining change of the state corresponding to the display position of the thumbnail 201 or the icon 202 at the time of moving the thumbnail 201 or the icon 202. For example, in drawing 30, the state A corresponds to a loop view and the state B corresponds to a square view.

[0175]When it clicks on the icon 202-3, in the state A corresponding to a loop view the processing manager 151, The contents manipulation routine 152-1 thru/or 152-N compute each position of the thumbnail 201-1 which draws next thru/or 201-N, and supplies each of the contents manipulation routine 152-1 thru/or 152-N.

[0176]The processing manager 151 computes the position of the thumbnail 201 based on the transition function which shows drawing 31 a graph. When distance of the position of the thumbnail 201 in the state B is set to 1 from the position of the thumbnail 201 in the state A, a transition function outputs the distance of the thumbnail 201 in the lapsed time t from the position of the thumbnail 201 in the state B based on the lapsed time t from the start of transition.

[0177]That is, in the position of the thumbnail 201 in the lapsed time t_i and the state A, when the position of the thumbnail 201 of A_i and the state B is set to B_i , the position C_i is computed by the thumbnail 201 by a formula (14).

[0178]

$$C_i = (A_i - B_i)d(t_i) + B_i \quad (14)$$

[0179]The distance d (t) decreases rapidly from 1, and the transition function is defined as the distance's d (t's) decreasing gently-sloping and being set to 0 after that as the lapsed time t increases in the portion near 0 in the lapsed time t. Thus, by defining a transition function, when movement of the thumbnail 201 is started, the display program 54F moves the thumbnail 201 quickly, and it moves the thumbnail 201 slowly as it approaches a movement destination.

[0180]By doing in this way, the display program 54F can lose the sense of incongruity accompanying movement of a user's thumbnail 201 while moving the thumbnail 201 promptly.

[0181]Any, such as what [not only] is shown in drawing 31 but a thing which the lapsed time t increases in the portion near 0, for example in the lapsed time t and which it is alike, therefore the distance d (t) decreases gradually from 1, and the distance d (t) decreases rapidly after that, and is set to 0, may be sufficient as a transition function.

[0182]Corresponding to the lapsed time t, the processing manager 151 computes each position of the thumbnail [/ based on a transition function] 201-1 thru/or 201-N in the distance d (t), and supplies each of the contents manipulation routine 152-1 thru/or 152-N. Each of the contents manipulation routine 152-1 thru/or 152-N draws the thumbnail 201-1 thru/or 201-N.

[0183]In the state C1 corresponding to the lapsed time t_1 , each of the thumbnail 201-1 thru/or 201-N is displayed on the position in the middle of moving toward the thumbnail 201-1 of the state B thru/or the position of 201-N. In the state C2 corresponding to the lapsed time t_2 in which predetermined time has passed since the lapsed time t_1 , each of the thumbnail 201-1 thru/or 201-N is further displayed on the position in the middle of moving toward the thumbnail 201-1 of the state B thru/or the position of 201-N.

[0184]In the state C3 corresponding to the lapsed time t_3 in which predetermined time passed, each of the thumbnail 201-1 thru/or 201-N is displayed on the position in the middle of movement of the nearer position of the thumbnail 201-1 of the state B thru/or the position of 201-N from the lapsed time t_2 .

[0185]The example of the position of the thumbnail 201 in the state C1 and the position of the thumbnail 201 in the state C2 is shown in drawing 32.

[0186]When the input of the purport that it should change in the state D is carried out, for example while changing in the state B from the state A, it changes in the state D from the state in the

middle of changing in the state B from the state A.

[0187]For example, in the state C2, as shown in drawing 33, when it clicks on the icon 202-4, the state C2 is made into a new start state, and it changes toward the state D corresponding to a spiral view. Transition to the state D is performed via the state E1 thru/or the state E2 like the transition to the state B from the state A from the state C2.

[0188]When the jog dial 4, the keyboard 5, or the touchpad 6 is operated in the spiral view, The processing manager 151 makes the position which the thumbnail 201 displays change in the time of the jog dial 4, the keyboard 5, and the touchpad 6 not being operated, as shown in drawing 34.

[0189]The processing manager 151 makes the position which the thumbnail 201 displays change in a spiral view in the time (for example, the arrow key is continuing being pressed) of the keyboard 5 etc. continuing and being pressed, and the time of the keyboard 5 etc. being pressed only once and detached immediately.

[0190]When the jog dial 4 and the keyboard 5 are not operated, for example, the processing manager 151 makes the contents manipulation routine 152 more specifically display the thumbnail 201 on the spiral of the larger radius r, as shown in drawing 35.

[0191]The jog dial 4 rotates continuously, or when the keyboard 5 is continuing being pressed, for example, the processing manager 151 makes the contents manipulation routine 152 display the thumbnail 201 on the spiral of the smaller radius r, as shown in drawing 36.

[0192]When the jog dial 4 rotated only one click, or the keyboard 5 is pressed only once and detached immediately, the processing manager 151 makes the contents manipulation routine 152 display the thumbnail 201 on the spiral of the middle radius r shown in drawing 35 and drawing 36.

[0193]The user of the personal computer 1 can judge immediately whether the jog dial 4 or the keyboard 5 is operated based on the display position of the thumbnail 201.

[0194]The display program 54F reproduces a predetermined sound, or it may be made to display a predetermined picture with change of the spiral radius r.

[0195]When the jog dial 4 and the keyboard 5 are not operated for the processing manager 151, When the thumbnail 201 is displayed on the spiral of the smaller radius r and the jog dial 4 or the keyboard 5 is operated, it may be made to make the contents manipulation routine 152 display the thumbnail 201 on the spiral of the bigger radius r.

[0196]Next, it attaches and explains to selection and the enlarged display of the thumbnail 201.

[0197]Drawing 37 thru/or drawing 39 are the figures explaining the selection and the enlarged display of the thumbnail 201 in a line view. When the thumbnail 201 as which "state where thumbnail 201 as which M" is displayed is chosen" H" is displayed is clicked, the display program 54F, [which is shown in drawing 37] As shown in drawing 38, all the thumbnails 201 currently displayed on the screen are moved so that the thumbnail 201 as which "H" is displayed may be located at the center of a screen. The display program 54F shifts to the state where the thumbnail 201 as which "H" is displayed is chosen.

[0198]When the thumbnail 201 as which "H" is displayed is clicked in the state where the thumbnail 201 as which "H" shown in drawing 38 is displayed is chosen, the display program 54F displays the picture corresponding to the thumbnail 201 as which "H" is displayed, as shown in drawing 39.

[0199]That is, when the data corresponding to the thumbnail 201 as which "H" is displayed is a still picture, the display program 54F displays a still picture in original size. When the data corresponding to the thumbnail 201 as which "H" is displayed is video, the display program 54F displays video in original size, and reproduces video. When the data corresponding to the thumbnail 201 as which "H" is displayed is a sound, the display program 54F expands the thumbnail 201 to predetermined size, displays it, and reproduces a sound.

[0200]It returns to the state shown in drawing 39 where the thumbnail 201 "the display program 54F indicates the state of a display to be to drawing 38 when the picture corresponding to the thumbnail 201 as which H" is displayed is clicked" and as which H" is displayed is chosen.

[0201]Drawing 40 thru/or drawing 42 are the figures explaining the selection and the enlarged display of the thumbnail 201 in a loop view. When the thumbnail 201 as which "Q" is displayed is clicked in the state where the thumbnail 201 as which "M" shown in drawing 40 is displayed is chosen, the display program 54F, As shown in drawing 41, all the thumbnails 201 currently displayed

on the screen are moved so that the thumbnail 201 as which "Q" is displayed may be located at the center of the longitudinal direction of a screen. The display program 54F shifts to the state where the thumbnail 201 as which "Q" is displayed is chosen.

[0202]When the thumbnail 201 as which "Q" is displayed is clicked in the state where the thumbnail 201 as which "Q" shown in drawing 41 is displayed is chosen, the display program 54F displays the picture corresponding to the thumbnail 201 as which "Q" is displayed, as shown in drawing 42.

[0203]That is, when the data corresponding to the thumbnail 201 as which "Q" is displayed is a still picture, the display program 54F displays a still picture in original size. When the data corresponding to the thumbnail 201 as which "Q" is displayed is video, the display program 54F displays video in original size, and reproduces video. When the data corresponding to the thumbnail 201 as which "Q" is displayed is a sound, the display program 54F expands the thumbnail 201 to predetermined size, displays it, and reproduces a sound.

[0204]If the picture corresponding to the thumbnail 201 as which "Q" is displayed shown in drawing 42 is clicked, the display program 54F will be returned to the state where the thumbnail 201 as which "Q" which shows drawing 41 the state of a display is displayed is chosen.

[0205]Drawing 43 thru/or drawing 45 are the figures explaining the selection and the enlarged display of the thumbnail 201 in a spiral view. When the thumbnail 201 as which "Z" is displayed is clicked in the state where the thumbnail 201 as which "M" shown in drawing 43 is displayed is chosen, the display program 54F, As shown in drawing 44, all the thumbnails 201 currently displayed on the screen are moved so that the thumbnail 201 as which "Z" is displayed may be located at the center of a screen. The display program 54F shifts to the state where the thumbnail 201 as which "Z" is displayed is chosen.

[0206]When the thumbnail 201 as which "Z" is displayed is clicked in the state where the thumbnail 201 as which "Z" shown in drawing 44 is displayed is chosen, the display program 54F displays the picture corresponding to the thumbnail 201 as which "Z" is displayed, as shown in drawing 45.

[0207]That is, when the data corresponding to the thumbnail 201 as which "Z" is displayed is a still picture, the display program 54F displays a still picture in original size. When the data corresponding to the thumbnail 201 as which "Z" is displayed is video, the display program 54F displays video in original size, and reproduces video. When the data corresponding to the thumbnail 201 as which "Z" is displayed is a sound, the display program 54F expands the thumbnail 201 to predetermined size, displays it, and reproduces a sound.

[0208]If the picture corresponding to the thumbnail 201 as which "Z" is displayed shown in drawing 45 is clicked, the display program 54F will be returned to the state where the thumbnail 201 as which "Z" which shows drawing 44 the state of a display is displayed is chosen.

[0209]Drawing 46 thru/or drawing 48 are the figures explaining the selection and the enlarged display of the thumbnail 201 in a square view. When the thumbnail 201 as which "B" is displayed is clicked in the state where the thumbnail 201 as which "M" shown in drawing 46 is displayed is chosen, the display program 54F, As shown in drawing 47, all the thumbnails 201 currently displayed on the screen are moved so that the thumbnail 201 as which "B" is displayed may be located at the center of a screen. The display program 54F shifts to the state where the thumbnail 201 as which "B" is displayed is chosen.

[0210]When the thumbnail 201 as which "B" is displayed is clicked in the state where the thumbnail 201 as which "B" shown in drawing 47 is displayed is chosen, the display program 54F displays the picture corresponding to the thumbnail 201 as which "B" is displayed, as shown in drawing 48.

[0211]That is, when the data corresponding to the thumbnail 201 as which "B" is displayed is a still picture, the display program 54F displays a still picture in original size. When the data corresponding to the thumbnail 201 as which "B" is displayed is video, the display program 54F displays video in original size, and reproduces video. When the data corresponding to the thumbnail 201 as which "B" is displayed is a sound, the display program 54F expands the thumbnail 201 to predetermined size, displays it, and reproduces a sound.

[0212]If the picture corresponding to the thumbnail 201 as which "B" is displayed shown in drawing 48 is clicked, the display program 54F will be returned to the state where the thumbnail 201 as which "B" which shows drawing 47 the state of a display is displayed is chosen.

[0213] Thus, when the thumbnail 201 is clicked, the display program 54F, Since the clicked thumbnail 201 is chosen, it expands and displays or video is reproduced, the user can choose desired data and can make it display or reproduce simply and promptly.

[0214] Next, transition of the state in the case of changing from the state shown in drawing 38 to the state which shows in drawing 39, Transition of the state in the case of changing from the state shown in drawing 41 to the state which shows in drawing 42, Transition of the state in the case of changing from the state shown in drawing 44 to the state which shows in drawing 45, Or transition of the state in the case of changing from the state shown in drawing 47 to the state which shows in drawing 48, And transition of the state in the case of changing from the state shown in drawing 39 to the state which shows in drawing 38, Transition of the state in the case of changing from the state shown in transition of the state in the case of changing from the state shown in transition of the state in the case of changing from the state shown in drawing 42 to the state which shows in drawing 41, and drawing 45 to the state which shows in drawing 44, or drawing 48 to the state which shows in drawing 47 is explained.

[0215] Transition of the state in the case of changing from the state shown in drawing 38 to the state which shows in drawing 39, Transition of the state in the case of changing from the state shown in drawing 41 to the state which shows in drawing 42, Transition of the state in the case of changing from the state shown in transition of the state in the case of changing from the state shown in drawing 44 to the state which shows in drawing 45, or drawing 47 to the state which shows in drawing 48 satisfies the display of the still picture of the request by a user, video, or a sound, or the reproductive demand. Since operation of the thumbnail 201 etc. aims final at a display or reproduction of a still picture, video, or a sound, this change state can be said to be large [importance] for a user as shown in drawing 49.

[0216] On the other hand, transition of the state in the case of changing from the state shown in drawing 39 to the state which shows in drawing 38, Transition of the state in the case of changing from the state shown in drawing 42 to the state which shows in drawing 41, Transition of the state in the case of changing from the state shown in transition of the state in the case of changing from the state shown in drawing 45 to the state which shows in drawing 44, or drawing 48 to the state which shows in drawing 47, It is transition to the transitional state aiming at operation of selection of other thumbnails 201 which terminate a display or reproduction of a still picture, video, or a sound, etc. This change state can be said to be small [importance] for a user as shown in drawing 49.

[0217] Then, as shown in drawing 50, when carrying out the change state with large importance for a user, For example, when indicating a desired still picture, video, or a sound or reproducing, in order to make a user recognize carrying out display or reproduction certainly, the display program 54F is the speed a user can recognize change of a display to be visually, and changes a display comparatively slowly.

[0218] On the other hand, when carrying out a change state with importance small for a user, the display of a desired still picture, video, or a sound is suspended, or reproduction is suspended, for example, and when changing into the display which the thumbnail 201 chooses, the display program 54F changes a display promptly.

[0219] Thus, since the display program 54F makes a user recognize transition of an important state certainly and it performs promptly transition of the state which is not comparatively important, it can fill recognition of the change state by a user, and the conflicting requirement of a quick response.

[0220] Next, the display about the thumbnail 201 chosen is explained. As shown in drawing 51, the display program 54F displays the frame 281 on the selected thumbnail 201, when the thumbnail 201 is chosen. The display program 54F eliminates the frame 281 from the thumbnail 201 which is not chosen, when other thumbnails 201 are chosen.

[0221] The display program 54F is made to run on the passage of time, and changes the brightness of the frame 281, chroma saturation, or hue. Drawing 52 is a figure explaining the example of change of the brightness of the frame 281 corresponding to progress of time, or chroma saturation.

[0222] For example, the display program 54F changes linearly the brightness of the frame 281 which

is 0%, or chroma saturation to 100% in 0.5 second, changes linearly the brightness of the frame 281 which is 100%, or chroma saturation to 0% in 0.5 second, and repeats this change.

[0223]The processing to which the brightness of the frame 281 is changed has little computational complexity as compared with the processing to which chroma saturation or hue is changed.

[0224]Drawing 53 is a figure explaining the example of change of the hue of the frame 281 corresponding to progress of time.

[0225]For example, the display program 54F changes linearly the hue of the frame 281 corresponding to 0 times of a hue circle to 360 degrees in 1 second, returns the hue of the frame 281 which reached 360 degrees of a hue circle to 0 times, and repeats this change.

[0226]The display program 54F can make a user recognize the thumbnail 201 chosen certainly by doing in this way out of the screen where the thumbnail 201 which has variegated brightness, color, or hue is displayed. The cycle which the user for 0.1 second thru/or about 10 seconds can recognize not only in for 1 second, for example may be sufficient as the brightness of the frame 281, chroma saturation, or the cycle of change of hue.

[0227]Drawing 54 is a figure explaining the display of the attribute of the data corresponding to the thumbnail 201 chosen, etc. When predetermined time passes without the display program's 54F displaying the frame 281 if the thumbnail 201 is chosen, and operating the touchpad 6 etc., Attributes, such as a file name of the file in which the data corresponding to the thumbnail 201 is stored, a title of data, a size of data, and regeneration time, are displayed on the additive-attributes display 291.

[0228]The display program 54F eliminates the frame 281 and the additive-attributes display 291 corresponding to the thumbnail 201, when the thumbnail 201 is not chosen.

[0229]For example, as shown in drawing 55, when the thumbnail 201 chose and carries out 1 second passage of the display program 54F, it displays attributes which show a file name, a still picture, or video, such as an icon, a size of data, and a date, on the additive-attributes display 291. In the example shown in drawing 55, the additive-attributes display 291 makes the frame and background the translucent display, in order that a user may enable the check of other thumbnails 201 which are not chosen.

[0230]Next, the mode of the full-screen display displayed on LCD7 of the whole is explained. When it starts, the display program 54F displays the thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7, as shown in drawing 56.

[0231]If a predetermined icon or the predetermined key of the keyboard 5 is operated, the display program 54F will display the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, as shown in drawing 57. When the display program 54F shows the picture to all of the viewing areas of the screen of LCD7, the personal computer 1, When the jog dial 4, the touchpad 6, or the keyboard 5 is operated except for operation of the combination of a specific key, etc., an input is received as operation to the display program 54F.

[0232]If the icon 301 shown in drawing 58 is operated while displaying the thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7, the display program 54F will display the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7. If the icon 301 shown in drawing 58 is operated while displaying the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, the display program 54F will display the thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7.

[0233]While displaying the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, when it clicks on the icon 311 shown in drawing 59, the display program 54F, While displaying the thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7, other application programs corresponding to the icon 311 are started.

[0234]Thus, the display program 54F can display the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, when operation of the icon 301 or the predetermined key of the keyboard 5 is operated. While displaying the thumbnail 201 etc. on all of the viewing areas of the screen of LCD7, corresponding to operation of the icon 311, the display program 54F can start other application programs directly. By displaying the thumbnail 201 etc. on all of the screens of LCD7, the operation mistake of the user of operating other application programs can be prevented.

[0235]Since the user wishes cooperation with the display program 54F and other application programs in many cases when other application programs corresponding to the icon 311 are started, The display program 54F displays the thumbnail 201 etc. on the predetermined range of the viewing area of the screen of LCD7 automatically. The user can operate the display program 54F and other application programs more efficiently.

[0236]Next, the processing which is the display program 54F and the reading program 54G which CPU51 executes is explained.

[0237]Drawing 60 is a flow chart explaining processing of reading of the contents of the display program 54F and the reading program 54G. In Step S11, the reading program 54G reads the number of the contents memorized by the memory stick 116 via the memory stick interface 114. The reading program 54G supplies the number of the contents memorized by the memory stick 116 to the display program 54F.

[0238]In Step S12, the reading program 54G reads the contents memorized by the memory stick 116 one by one via the memory stick interface 114, and supplies the contents which reading ended to the display program 54F. Processing of reading of the contents from the memory stick 116 by the reading program 54G is performed in parallel to the following processings.

[0239]In Step S13, the processing manager 151 of the display program 54F asks for the number of the contents which the reading program 54G read based on the data supplied from the reading program 54G. In Step S14, the processing manager 151 of the display program 54F specifies the first contents that the reading program 54G read.

[0240]In Step S15, the processing manager 151 of the display program 54F computes the position which displays the thumbnail 201 corresponding to contents. In Step S16, the contents manipulation routine 152 of the display program 54F generates the thumbnail 201 corresponding to the read contents. In Step S17, the contents manipulation routine 152 of the display program 54F displays the thumbnail 201 on the position which the processing manager 151 computed. The contents manipulation routine 152 does not display the thumbnail 201, when the position which displays the thumbnail 201 is out of the viewing area of LCD7.

[0241]In Step S18, the display program 54F, It is judged whether the thumbnail 201 corresponding to all the contents which reading ended was generated, When judged with not generating the thumbnail 201 corresponding to all the contents, it progresses to Step S19 and the processing manager 151 of the display program 54F specifies the following contents which the reading program 54G read.

[0242]In Step S20, the processing manager 151 of the display program 54F, Based on the data supplied from the reading program 54G, the reading program 54G asks for the number of the contents which reading ended, returns to Step S15, and repeats processing of generation of the thumbnail 201.

[0243]When judged with having generated the thumbnail 201 corresponding to all the contents which reading ended in Step S18, progress to Step S21 and the display program 54F, When it judges whether all the contents memorized by the memory stick 116 were read and is judged with having read no contents memorized by the memory stick 116, it returns to Step S12 and processing is repeated from reading of contents.

[0244]As opposed to all the contents memorized by the memory stick 116 when judged with having read all the contents memorized by the memory stick 116 in Step S21, Since the thumbnail 201 was generated and the predetermined thumbnail 201 was generated, processing is ended.

[0245]Thus, the display program 54F and the reading program 54G read contents from the memory stick 116 one by one, can be made to be able to respond to the read contents, can make the thumbnail 201 able to generate, and can be displayed on LCD7.

[0246]Next, processing of a display of the voice data based on the display program 54F is explained with reference to the flow chart of drawing 61. In Step S31, the display program 54F makes the thumbnail 201 of a predetermined size correspond to the size of voice data, and is divided into a predetermined number of fields. The display program 54F increases the number of division of the thumbnail 201, when voice data is large, and when voice data is small, it lessens the number of division of the thumbnail 201.

[0247]In Step S32, the display program 54F extracts the data of the predetermined length

corresponding to the number of division of the thumbnail 201 (the number of fields) from voice data. In Step S33, the display program 54F changes the extracted data into the data (data of same number as the number of fields of RGB) of RGB by processing explained with reference to drawing 11. In Step S34, the display program 54F sets each data of RGB as each of the field of the thumbnail 201 generated by division.

[0248]In Step S35, the display program 54F processes a shading off to the thumbnail 201 (Buller processing). In Step S36, the display program 54F overwrites the text etc. in which the attribute corresponding to voice data is shown at the position of the thumbnail 201, and ends processing. [0249]Thus, the display program 54F can generate the thumbnail 201 of the audio data corresponding to the size of voice data. The display program 54F is the same processing, and generates the thumbnail 201 corresponding to the data of a text etc.

[0250]Next, processing of a display of the line view by the display program 54F is explained with reference to the flow chart of drawing 62. In Step S51, the display program 54F determines the number of the axes 221. For example, the display program 54F sets the number of the axes 221 to 1, when displaying only the thumbnail 201, and when displaying the thumbnail 201 and the text 211, it sets the number of the axes 221 to 2.

[0251]In Step S52, the display program 54F determines direction of the axis 221 based on a formula (1) or a formula (2). In Step S53, the display program 54F determines the display position of the thumbnail 201 based on the axis 221.

[0252]In Step S54, it progresses to Step S55 and the display program 54F opts for arrangement of the text 211 based on the axis 221, when it judges whether the text 211 corresponding to contents is displayed and is judged with displaying the text 211 corresponding to contents. In Step S56, the display program 54F displays the text 211 on the position determined by processing of Step S55, and follows it to Step S57.

[0253]In Step S54, since the processing which displays the text 211 is unnecessary when judged with not displaying the text 211 corresponding to contents, processing of Step S55 and Step S56 is skipped, and procedure progresses to Step S57.

[0254]In Step S57, the display program 54F displays the thumbnail 201 on the position determined by processing of Step S53, returns to Step S52, and repeats processing of a display.

[0255]As mentioned above, the display program 54F displays the thumbnail 201 and the text 211 based on the axis 221 which a straight line or a curve opened.

[0256]Next, processing of a display of the loop view by the display program 54F is explained with reference to the flow chart of drawing 63. In Step S71, the display program 54F determines the number of the axes 241. For example, the display program 54F sets the number of the axes 241 to 1, when displaying only the thumbnail 201, and when displaying the thumbnail 201 and the text 211, it sets the number of the axes 241 to 2.

[0257]In Step S72, the display program 54F determines the form of the axis 241. In Step S73, the display program 54F determines the display position of the thumbnail 201 by a formula (6) based on the axis 241, for example.

[0258]In Step S74, it progresses to Step S75 and the display program 54F opts for arrangement of the text 211 based on the axis 241, when it judges whether the text 211 corresponding to contents is displayed and is judged with displaying the text 211 corresponding to contents. In Step S76, the display program 54F displays the text 211 on the position determined by processing of Step S75, and follows it to Step S77.

[0259]In Step S74, since the processing which displays the text 211 is unnecessary when judged with not displaying the text 211 corresponding to contents, processing of Step S75 and Step S76 is skipped, and procedure progresses to Step S77.

[0260]In Step S77, the display program 54F displays the thumbnail 201 on the position determined by processing of Step S73, returns to Step S73, and repeats processing of a display.

[0261]As mentioned above, the display program 54F displays the thumbnail 201 and the text 211 based on the axis 241 which a circle or an ellipse closed.

[0262]Next, processing of a display of the spiral view by the display program 54F is explained with reference to the flow chart of drawing 64. In Step S91, the display program 54F determines the

number of the axes 261. For example, the display program 54F sets the number of the axes 261 to 1, when displaying only the thumbnail 201, and when displaying the thumbnail 201 and the text 211, it sets the number of the axes 261 to 2.

[0263]In Step S92, the display program 54F, The jog dial 4, the keyboard 5, or the touchpad 6 is operated. When it judges whether selection of the thumbnail 201 is inputted and is judged with selection of the thumbnail 201 not being inputted, it progresses to Step S93, and a spiral with the large radius r is set as the axis 261, and it progresses to Step S95.

[0264]In Step S92, when judged with selection of the thumbnail 201 being inputted, it progresses to Step S94, and corresponding to the frequency of the input of per unit time of selection, the display program 54F sets the smaller spiral of the radius r as the axis 261, and follows it to Step S95.

[0265]In Step S95, the display program 54F determines the display position of the thumbnail 201 by the formula (11), the formula (12), and a formula (13) based on the axis 261, for example.

[0266]In Step S96, it progresses to Step S97 and the display program 54F opts for arrangement of the text 211 based on the axis 261, when it judges whether the text 211 corresponding to contents is displayed and is judged with displaying the text 211 corresponding to contents. In Step S98, the display program 54F displays the text 211 on the position determined by processing of Step S97, and follows it to Step S99.

[0267]In Step S96, since the processing which displays the text 211 is unnecessary when judged with not displaying the text 211 corresponding to contents, processing of Step S97 and Step S98 is skipped, and procedure progresses to Step S99.

[0268]In Step S99, the display program 54F displays the thumbnail 201 on the position determined by processing of Step S95, returns to Step S92, and repeats processing of a display.

[0269]Thus, the display program 54F displays the thumbnail 201 and the text 211 based on the spiral axis 261. When judged with selection of the thumbnail 201 being inputted, the display program 54F displays the thumbnail 201 and the text 211 based on the axis 261 of the spiral of the small radius r .

[0270]Next, processing of movement of the icon 202 by the display program 54F is explained with reference to the flow chart of drawing 65. In Step S111, the processing manager 151 of the display program 54F, When it judges whether it clicked on one of the icons 202 based on the input from the touchpad 6 and is judged with clicking on neither of the icons 202, it returns to Step S111, and processing of a judgment is repeated until it clicks on one of the icons 202.

[0271]In Step S111, when judged with having clicked on one of the icons 202, it progresses to Step S112 and the processing manager 151 of the display program 54F computes the final display position of the icon 202 of *****.

[0272]the final display position of each icon 202 which the processing manager 151 of the display program 54F computed by processing of Step S112 in Step S113 — and the display position of each icon 202 is computed based on the lapsed time after being clicked. In Step S114, the icon manipulation routine 152 of the display program 54F displays the icon 202 on the display position computed by processing of Step S113.

[0273]Processing of a display of the icon 202 in Step S114 is performed with the cycle set up by the processing manager 151. By choosing the cycle of processing of a display of the icon 202 suitably, the icon 202 is displayed as it is moving.

[0274]In Step S115, the processing manager 151 of the display program 54F, When it judges whether each icon 202 was displayed on the final display position and judges that it is not displayed on a final display position by each icon 202, it returns to Step S113 and processing of a display of an icon is repeated.

[0275]In Step S115, when it judges that it was displayed on the final display position by each icon 202, it returns to Step S111 and processing is repeated from processing of a judgment of whether to have clicked on the icon 202.

[0276]Thus, when it clicks on the icon 202, the display program 54F is a predetermined speed, and it can display the icon 202 so that it may move.

[0277]Next, processing of a display of the afterimage by the display program 54F is explained with reference to the flow chart of drawing 66. In Step S131, the display program 54F lowers the

brightness of the picture already displayed, and draws (to for example, 80%).

[0278]In Step S132, the picture which drew a new picture by processing of Step S131 is overwritten, it draws, and the display program 54F returns to Step S131, and repeats processing of drawing.

[0279]Thus, since the display program 54F draws so that the brightness of the picture which already drew may fall gradually, and it overwrites a new picture, it can display an afterimage simply.

[0280]Next, processing of the change state by the display program 54F is explained with reference to the flow chart of drawing 67. In Step S151, the display program 54F records the state of origin which changes, such as the present thumbnail 201 or a display position of the icon 202. In Step S152, the display program 54F determines the state of the points which change, such as a display position of the movement destination of the thumbnail 201 or the icon 202.

[0281]In Step S153, the display program 54F searches for the importance of transition. For example, the importance of transition is beforehand defined for every transition, and is memorized by the display program 54F. In Step S154, the display program 54F determines a transition function based on the importance of transition. For example, the display program 54F chooses the transition function which makes a state change slowly when the importance of transition is large, and when the importance of transition is small, it chooses the transition function which makes a state change quickly.

[0282]In Step S155, the display program 54F computes the following state based on a transition function corresponding to lapsed time. In Step S156, the display program 54F shifts to the state where it computed by processing of Step S155. For example, in Step S155, the display program 54F computes the position of the thumbnail 201 and the icon 202 corresponding to lapsed time, and displays the thumbnail 201 and the icon 202 on the computed position in Step S156.

[0283]In Step S157 — the display program 54F — the jog dial 4, the touchpad 6, or the keyboard 5 — when judged with judging whether the state of the point which changes based on the signal from each is changed, and not changing the state of the point which changes, it progresses to Step S158.

[0284]In Step S157, when judged with changing the state of the point which changes, it progresses to Step S159 and the present state is set as the state of the origin which changes. In Step S160, the display program 54F determines the state of the points which change, such as a display position of the movement destination of the thumbnail 201 or the icon 202.

[0285]In Step S161, the display program 54F searches for the importance of new transition. In Step S162, the display program 54F determines a transition function based on the importance of new transition.

[0286]In Step S158, the display program 54F, When judged with judging whether the present state was compared with the state of the point which changes, and the state of the point which changes was reached, and not having reached the state of the point which changes, it returns to Step S155 and processing is repeated from the processing which computes the following state.

[0287]In Step S158, when judged with having reached the state of the point which changes, processing is ended.

[0288]As mentioned above, the display program 54F changes in the state where it was required from the state, when the state of a display, etc. are changed and there is a demand in the middle of transition based on a transition function. Since the display program 54F chooses a transition function based on the importance of transition, in large transition of importance, a state shifts comparatively slowly so that a user can recognize a change state certainly, and a state shifts promptly in small transition of importance.

[0289]Next, processing of the enlarged display by the display program 54F is explained with reference to the flow chart of drawing 68. In Step S181, when it judges whether the thumbnail 201 was clicked based on the signal from the touchpad 6 and is judged with the thumbnail 201 not being clicked, the display program 54F returns to Step S181, and repeats processing of a judgment.

[0290]In processing of Step S181, when judged with the thumbnail 201 having been clicked, it progresses to Step S182 and the display program 54F judges whether the clicked thumbnail 201 is located in the center of a window.

[0291]When judged with the clicked thumbnail 201 not being located in the center of a window in Step S182, progress to Step S183 and the display program 54F. A display is changed so that the clicked thumbnail 201 may be located in the center of a window, and it returns to Step S181, and processing is repeated.

[0292]When judged with the clicked thumbnail 201 being located in the center of a window in Step S182, progress to Step S184 and the display program 54F. The enlarged display of the clicked thumbnail 201 is carried out (when the thumbnail 201 corresponds to the data of a still picture, it displays in an original size, when it corresponds to the data of video, video is generated, and a sound is reproduced when it corresponds to audio data), it returns to Step S181, and processing is repeated.

[0293]Thus, when the thumbnail 201 is clicked, the display program 54F. Since the clicked thumbnail 201 is displayed in the center or an enlarged display is carried out, the user can know promptly the contents of the data corresponding to the thumbnail 201 and the thumbnail 201 by easy operation.

[0294]Next, processing of a display of the frame 281 by the contents manipulation routine 15 of the display program 54F is explained with reference to the flow chart of drawing 69. In Step S201, the contents manipulation routine 152. When it judges whether the thumbnail 201 which he is displaying is chosen and is judged with the thumbnail 201 which he is displaying not being chosen, it returns to Step S201, and processing of a judgment is repeated until the thumbnail 201 which he is displaying is chosen.

[0295]In Step S201, when judged with the thumbnail 201 which he is displaying being chosen, it progresses to Step S202 and the contents manipulation routine 152 starts the count of lapsed time. Processing of count-up of lapsed time is continued also in execution of the following processings.

[0296]In Step S203, the contents manipulation routine 152 determines the function of a luminosity variation which shows drawing 52 an example, for example. In Step S204, the contents manipulation routine 152 computes the brightness of the frame 281 based on lapsed time. In Step S205, the contents manipulation routine 152 displays the frame 281 of the brightness computed by processing of Step S204.

[0297]In Step S206, it progresses to Step S204 and the contents manipulation routine 152 repeats processing of a display of the frame 281, when it judges whether the thumbnail 201 which he is displaying is chosen and is judged with the thumbnail 201 which he is displaying being chosen.

[0298]In Step S206, when judged with the thumbnail 201 which he is displaying not being chosen, it progresses to Step S207, and the contents manipulation routine 152 eliminates the frame 281, returns to Step S201, and repeats processing of a display of the frame 281.

[0299]Thus, the display program 54F can display the frame 281 which changed brightness to the thumbnail 201 chosen periodically. The display program 54F can display the frame 281 which changed chroma saturation or hue to the thumbnail 201 which is the same processing and is chosen periodically.

[0300]Next, processing of a display of the additive-attributes display 291 by the contents manipulation routine 15 of the display program 54F is explained with reference to the flow chart of drawing 70. In Step S221, the display program 54F, the jog dial 4, the touchpad 6, or the keyboard 5 -- based on the signal supplied from each, When it judges whether change of the display was inputted and is judged with change of a display not being inputted, it progresses to Step S222 and the contents manipulation routine 152 judges whether the thumbnail 201 which he is displaying is chosen.

[0301]In Step S222, when judged with the thumbnail 201 which he is displaying being chosen, it progresses to Step S223, and the contents manipulation routine 152 judges whether predetermined time (for example, for 1 second) passed, after the thumbnail 201 is chosen.

[0302]When judged with predetermined time having passed in Step S223, progress to Step S224 and the contents manipulation routine 152. The frame and background containing the text corresponding to the thumbnail 201 display the translucent additive-attributes display 291, return to Step S221, and repeat processing.

[0303]Since processing of moving the thumbnail 201 is performed when judged with change of a display being inputted in Step S221, Progressing to Step S225, the contents manipulation routine

152 eliminates the additive-attributes display 291 corresponding to the thumbnail 201, returns to Step S221, and repeats processing.

[0304]Since it is not necessary to display the additive-attributes display 291 when judged with the thumbnail 201 which he is displaying not being chosen in Step S222, Progressing to Step S225, the contents manipulation routine 152 eliminates the additive-attributes display 291 corresponding to the thumbnail 201, returns to Step S221, and repeats processing.

[0305]In Step S223, when judged with predetermined time not having passed, it progresses to Step S225, and the contents manipulation routine 152 eliminates the additive-attributes display 291 corresponding to the thumbnail 201, returns to Step S221, and repeats processing.

[0306]Thus, since the display program 54F displays the additive-attributes display 291 corresponding to the thumbnail 201 chosen after the thumbnail 201 is chosen and predetermined time passes, A display can be made to change at high speed, and it can avoid checking a user's operation.

[0307]Since the frame and background of the additive-attributes display 291 which the display program 54F displays are translucent, the user can check the thumbnail 201 etc. which are arranged at the additive-attributes display 291 bottom (back side of a screen).

[0308]Next, the 1st display mode that displays the thumbnail 201 etc. on the predetermined field of the display surface of LCD7 by the display program 54F, Or processing of selection of the 2nd display mode that displays the thumbnail 201 etc. on all of the display surfaces of LCD7 is explained with reference to the flow chart of drawing 71. In Step S251, the display program 54F sets up the 1st display mode (the thumbnail 201 etc. are displayed on the predetermined field of the display surface of LCD7) that displays the frame of a predetermined field.

[0309]In Step S252, the display program 54F, Since it is considered as the 1st display mode when it judges whether other application programs were started and is judged with other application programs having been started, a display mode is not changed, but it returns to Step S252, and processing of a judgment is repeated.

[0310]When judged with other application programs not being started in Step S252, progress to Step S253 and the display program 54F, the jog dial 4, the touchpad 6, or the keyboard 5 — it is judged whether change of the display mode was inputted based on the signal supplied from each.

[0311]In Step S253, since it is not necessary to change a display mode when judged with change of a display mode not being inputted, it returns to Step S252 and processing of a judgment is repeated.

[0312]In Step S253, when judged with change of the display mode having been inputted, it progresses to Step S254 and the display program 54F sets up the 2nd display mode displayed on the whole display screen of LCD7.

[0313]In Step S255, the display program 54F, When it judged whether other application programs were started and is judged with other application programs not being started, progressing to Step S256 — the jog dial 4, the touchpad 6, or the keyboard 5 — it is judged whether change of the display mode was inputted based on the signal supplied from each.

[0314]In Step S256, since it is not necessary to change a display mode when judged with change of a display mode not being inputted, it returns to Step S255 and processing of a judgment is repeated.

[0315]In Step S256, when judged with change of the display mode having been inputted, it returns to Step S251, and the display program 54F is set as the 1st display mode, and repeats processing.

[0316]In Step S255, since it changes into the 1st display mode when judged with other application programs having been started, it returns to Step S251, and the display program 54F is set as the 1st display mode, and repeats processing.

[0317]Thus, the display program 54F can be changed to the 1st display mode, when the 1st display mode and 2nd display mode are changed corresponding to an input and other application programs are started.

[0318]Although a series of processings mentioned above can also be performed by hardware, they can also be performed with software. The computer by which the program which constitutes the software is included in hardware for exclusive use when performing a series of processings with

software, Or it is installed in the personal computer etc. which can perform various kinds of functions, for example, are general-purpose, etc. from a program storing medium by installing various kinds of programs.

[0319]The program storing medium which stores the program which is installed in a computer and it changes into the state which can be performed by computer, As shown in drawing 5, the magnetic disk 121 (a floppy disk is included), the optical disc 122 (CD-ROM (Compact Disc-Read Only Memory)). DVD (Digital Versatile Disc) is included. The package media which consist of the magneto-optical disc 123 (MD (Mini-Disc) is included) or the semiconductor memory 124, or a program is constituted by ROM stored temporarily or permanently, HDD67, etc. Storing of the program to a program storing medium is performed via the interface of a router, the modem 75, etc. using the communication media of cables or radio, such as a Local Area Network, the Internet, and digital satellite broadcasting, if needed.

[0320]In this specification, even if the processing serially performed in accordance with an order that the step which describes the program stored in a program storing medium was indicated is not of course necessarily processed serially, it also includes a parallel target or the processing performed individually.

[0321]In this specification, a system expresses the whole device constituted by two or more devices.

[0322]

[Effect of the Invention]According to the information processor according to claim 1, the information processing method according to claim 3, and the program storing medium according to claim 4. A user's operation is detected, the thumbnail corresponding to data is generated, and it corresponds to the frequency in the unit time of the detected operation. Since the display was controlled so that the position of a display of a thumbnail was specified and displayed a thumbnail on the specified position, it can know certainly that operation was added to the thumbnail.

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1]An information processor comprising:

A detection means to detect a user's operation.

A creating means which generates a thumbnail corresponding to data.

A setting means which specifies a position of a display of said thumbnail corresponding to frequency in unit time of operation which said detection means detected.

A display control means which controls a display to display said thumbnail on a position specified by said setting means.

[Claim 2]The information processor according to claim 1, wherein said setting means specifies a position of a display of said thumbnail on a spiral of imagination of a radius corresponding to frequency in unit time of operation.

[Claim 3]An information processing method comprising:

A detecting step which detects a user's operation.

A generation step which generates a thumbnail corresponding to data.

A specification step which specifies a position of a display of said thumbnail corresponding to frequency in unit time of operation detected by processing of said detecting step.

A display control step which controls a display to display said thumbnail on a position specified by processing of said specification step.

[Claim 4]A program storing medium with which a program which a computer can read is stored, comprising:

A detecting step which detects a user's operation.

A generation step which generates a thumbnail corresponding to data.

A specification step which specifies a position of a display of said thumbnail corresponding to frequency in unit time of operation detected by processing of said detecting step.

A display control step which controls a display to display said thumbnail on a position specified by processing of said specification step.

[Translation done.]

* NOTICES *

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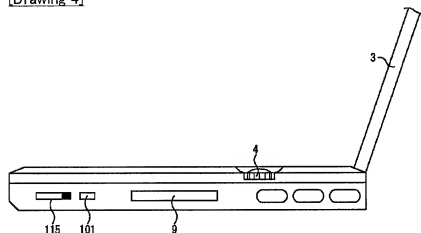
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

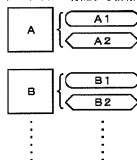
DRAWINGS

[Drawing 4]

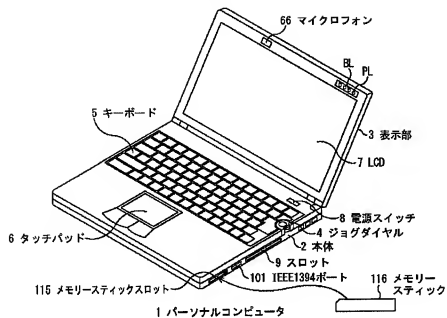


[Drawing 14]

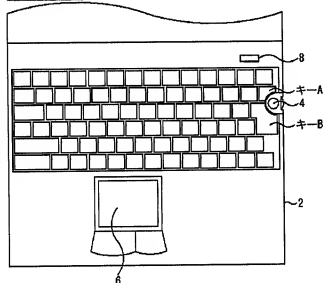
サムネイル 付随する情報



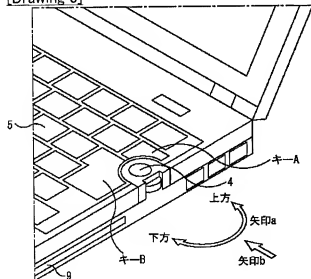
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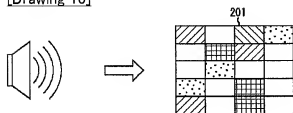
[Drawing 2]



[Drawing 3]



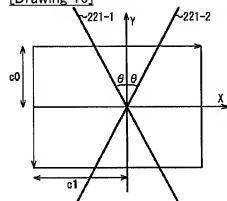
[Drawing 10]



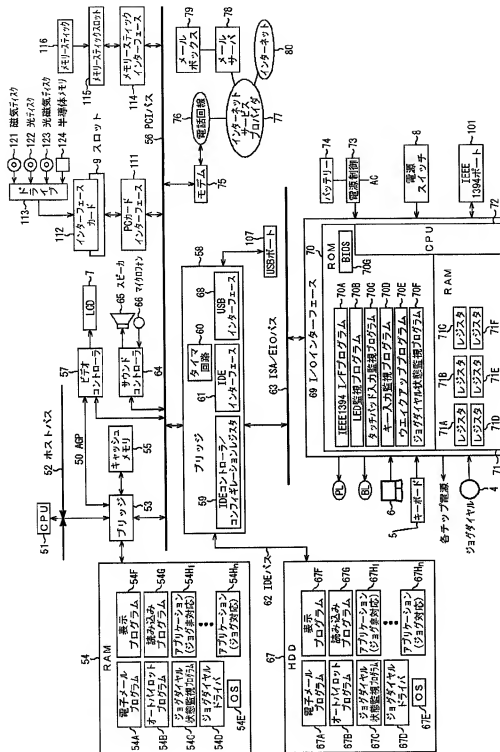
[Drawing 13]



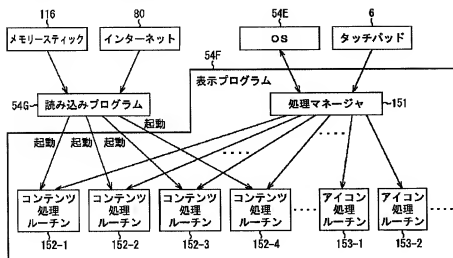
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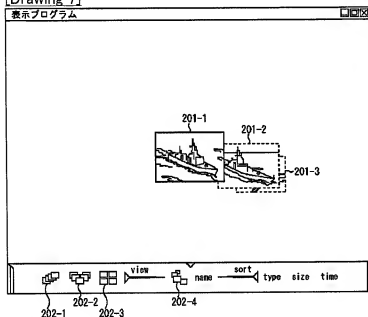
[Drawing 5]



[Drawing 6]



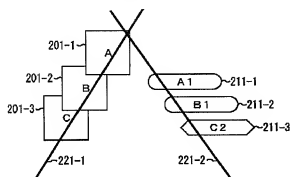
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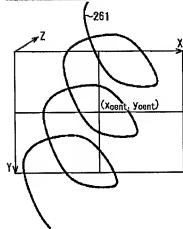
[Drawing 12]



[Drawing 15]



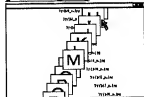
[Drawing 23]



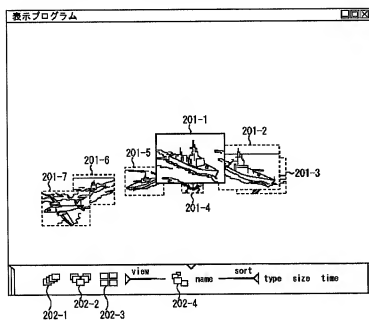
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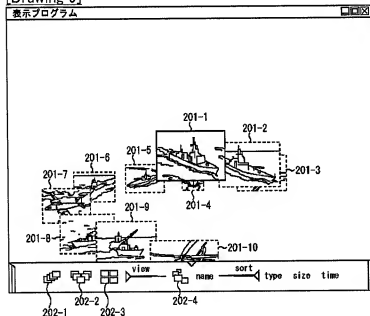
[Drawing 37]



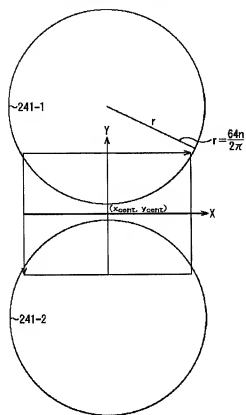
[Drawing 8]



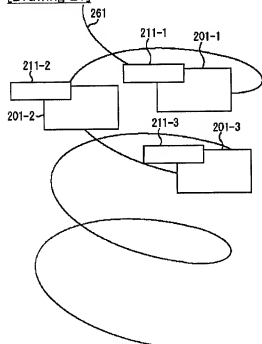
[Drawing 9]



[Drawing 20]



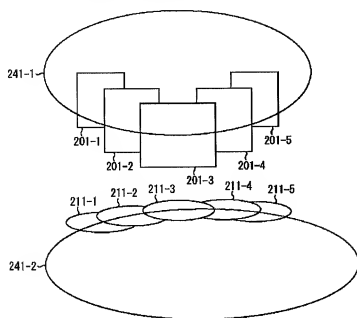
[Drawing 21]



[Drawing 11]



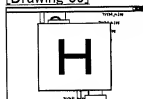
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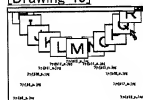
[Drawing 38]



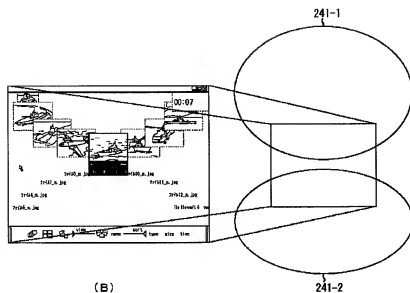
[Drawing 39]



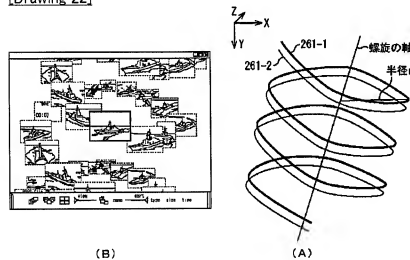
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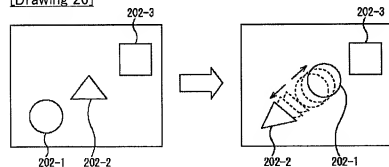
[Drawing 19]



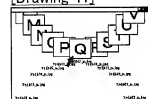
[Drawing 22]



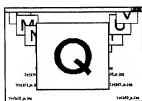
[Drawing 26]



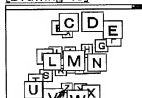
[Drawing 41]



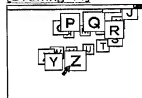
[Drawing 42]



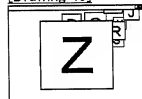
[Drawing 43]



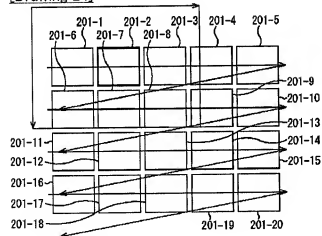
[Drawing 44]



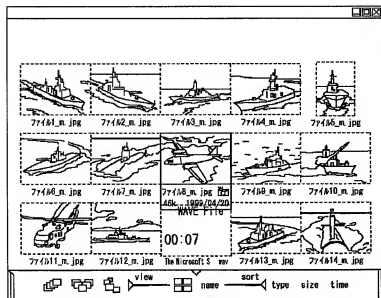
[Drawing 45]



[Drawing 24]



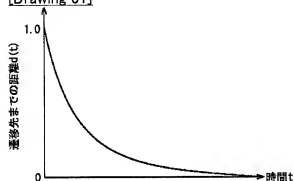
[Drawing 25]



[Drawing 30]



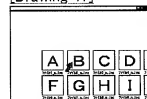
[Drawing 31]



[Drawing 46]



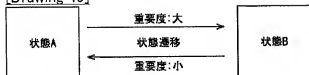
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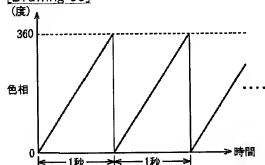
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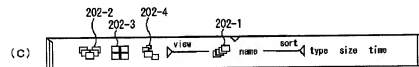
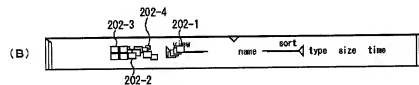
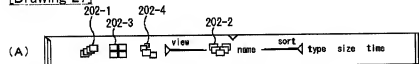
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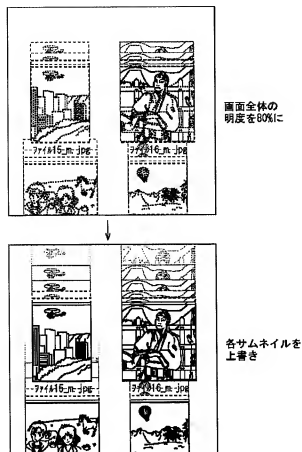
[Drawing 53]



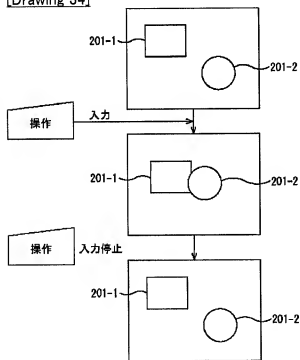
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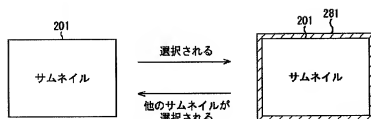
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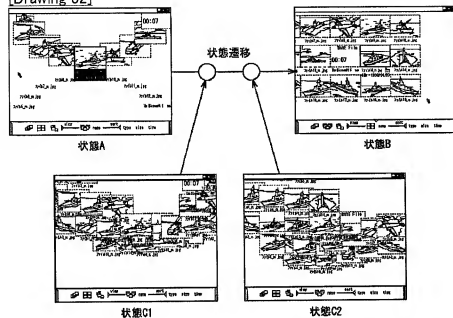
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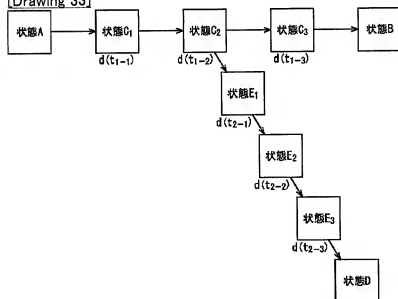
[Drawing 51]



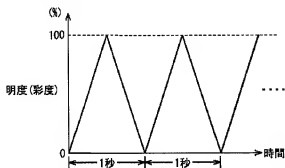
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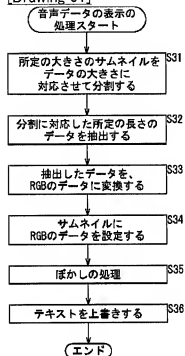
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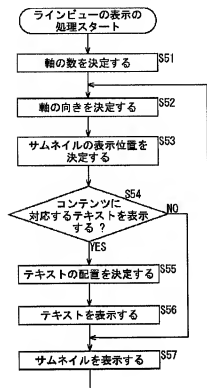
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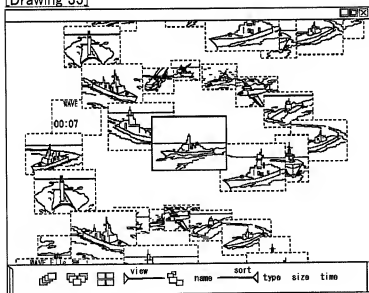
[Drawing 61]



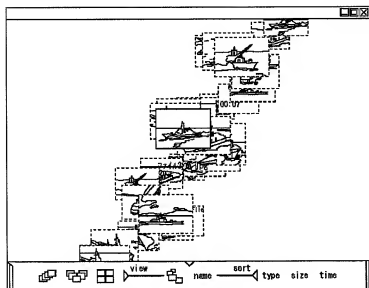
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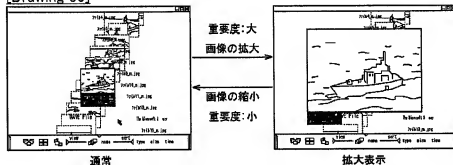
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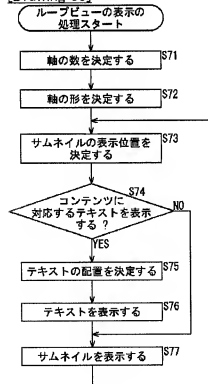
[Drawing 36]



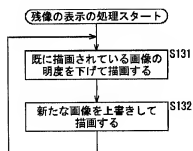
[Drawing 50]



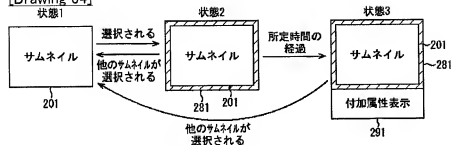
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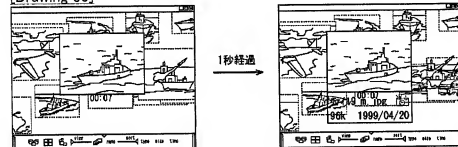
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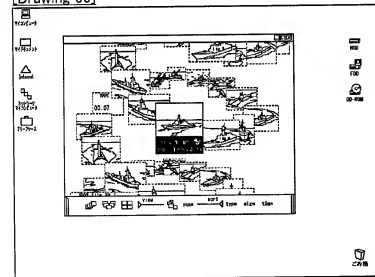
[Drawing 54]



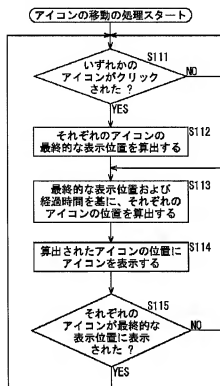
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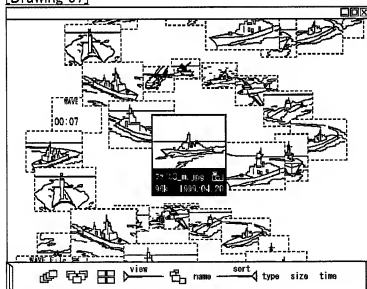
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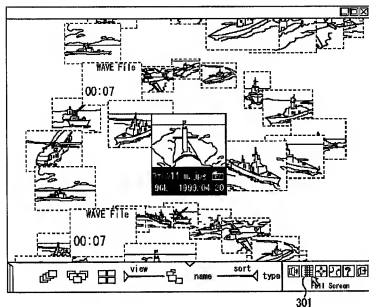
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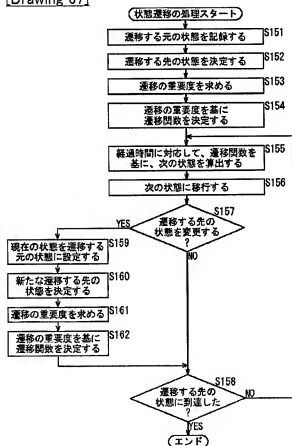
[Drawing 57]



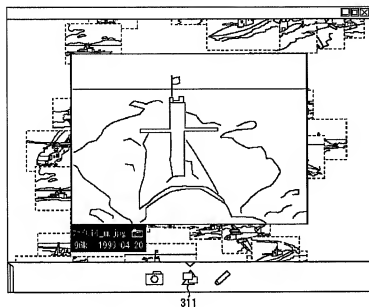
[Drawing 58]



[Drawing 67]

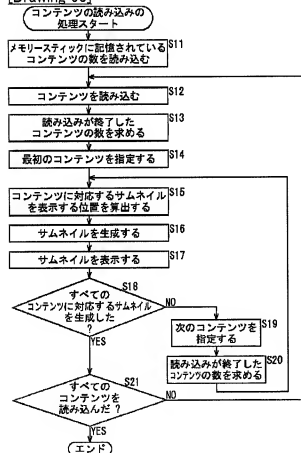


[Drawing 59]

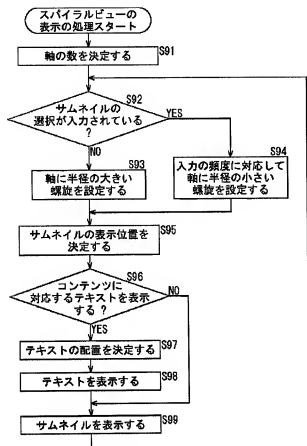


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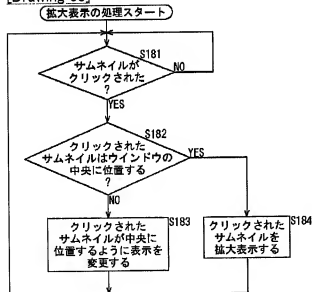
[Drawing 60]



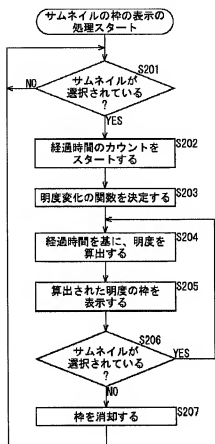
[Drawing 64]



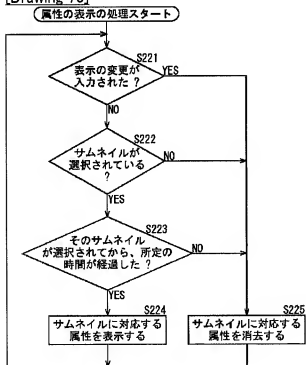
[Drawing 68]



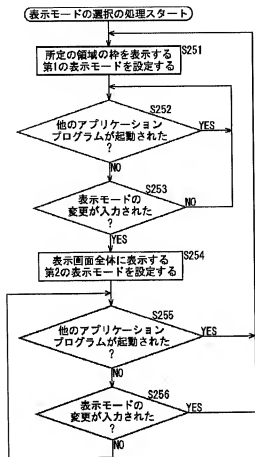
[Drawing 69]



[Drawing 70]



[Drawing 71]



[Translation done.]